US010081899B2

(12) **United States Patent**
Seo et al.

(10) **Patent No.: US 10,081,899 B2**
(45) **Date of Patent: *Sep. 25, 2018**

(54) **PORTABLE LAUNDRY TREATING APPARATUS**

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(73) Assignee: **LG ELECTRONICS INC.**, Seoul (KR)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 134 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/293,917**

(22) Filed: **Jun. 2, 2014**

(65) **Prior Publication Data**

US 2014/0352365 A1 Dec. 4, 2014

(30) **Foreign Application Priority Data**

Jun. 3, 2013 (KR) 10-2013-0063298
Jun. 3, 2013 (KR) 10-2013-0063299
Jun. 3, 2013 (KR) 10-2013-0063300

(51) **Int. Cl.**
D06F 35/00 (2006.01)
D06F 39/02 (2006.01)
D06F 43/00 (2006.01)

(52) **U.S. Cl.**
CPC ***D06F 35/00*** (2013.01); ***D06F 39/02*** (2013.01); ***D06F 43/002*** (2013.01)

(58) **Field of Classification Search**
CPC D06F 39/02; D06F 35/00; D06F 43/00; D06F 43/002; D06B 1/02
USPC ..... 15/321; 68/17 R
See application file for complete search history.

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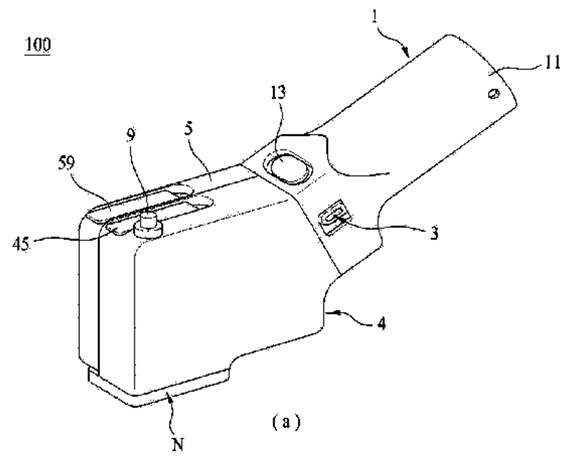
(57) **ABSTRACT**

A hand-held laundry treating apparatus includes a portable body, a supply tank including a tank body provided at the portable body, a water chamber provided in the tank body to store water therein and a detergent chamber provided in the tank body to store detergent therein, a suction tank including a suction chamber provided at the portable body to store liquid therein, and a liquid transferring part for supplying liquid stored in the supply tank to laundry and transferring liquid remaining in laundry to the suction tank.

13 Claims, 12 Drawing Sheets



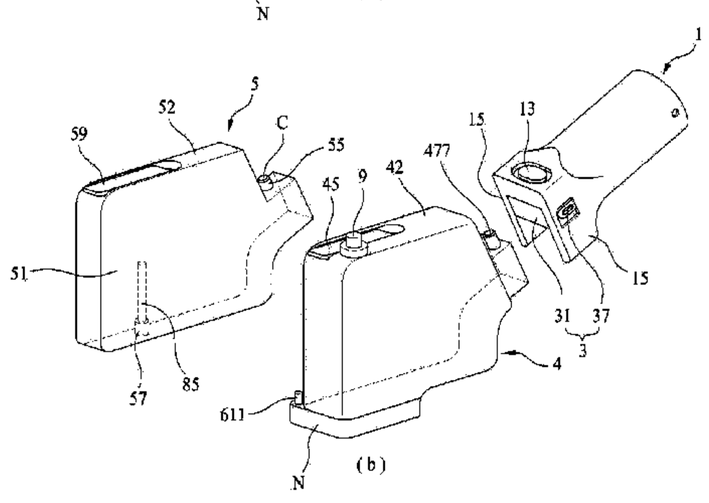


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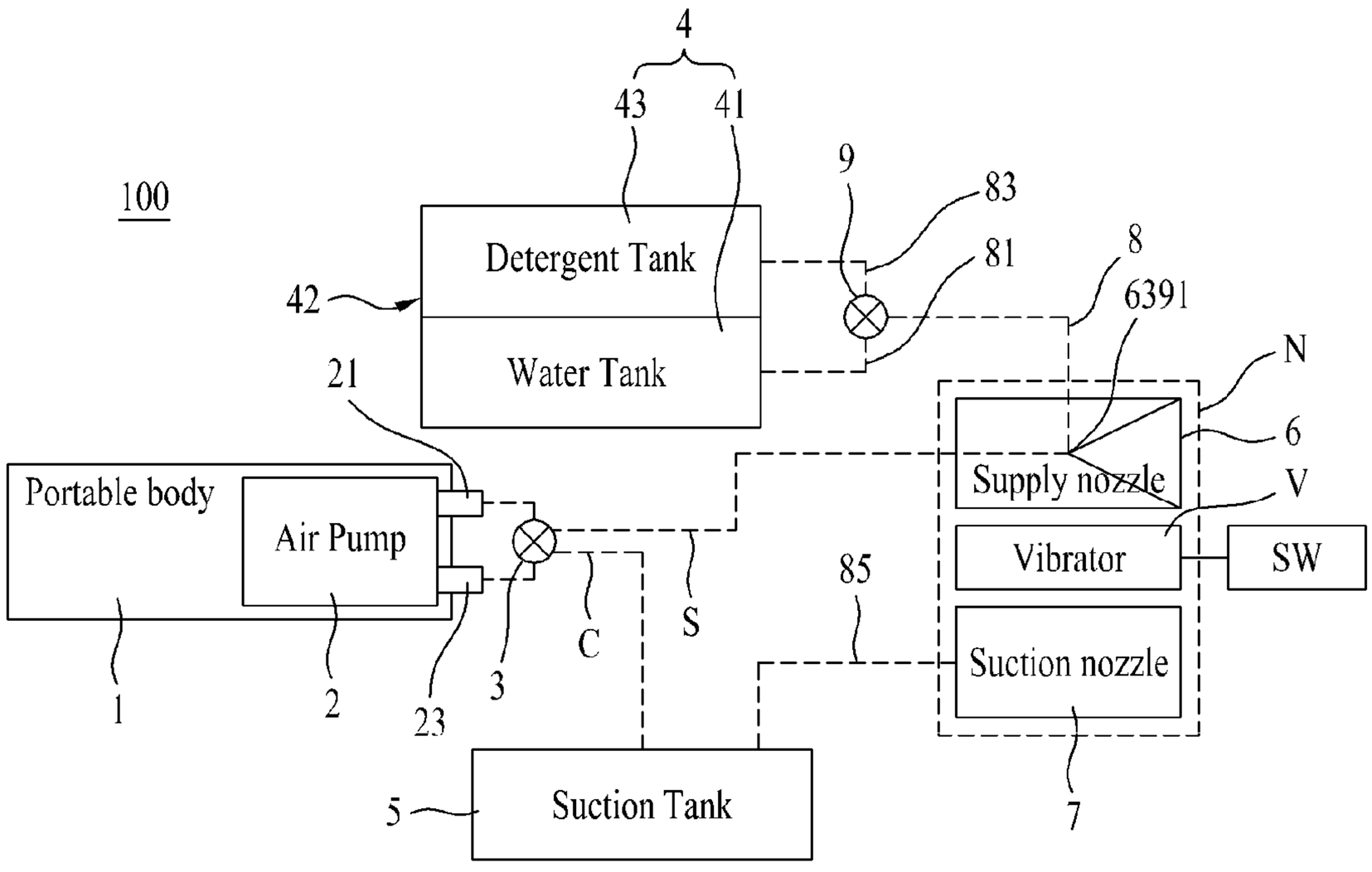
Fig. 1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43
41
9
83
81
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6391
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Detergent Tank
42
Water Tank
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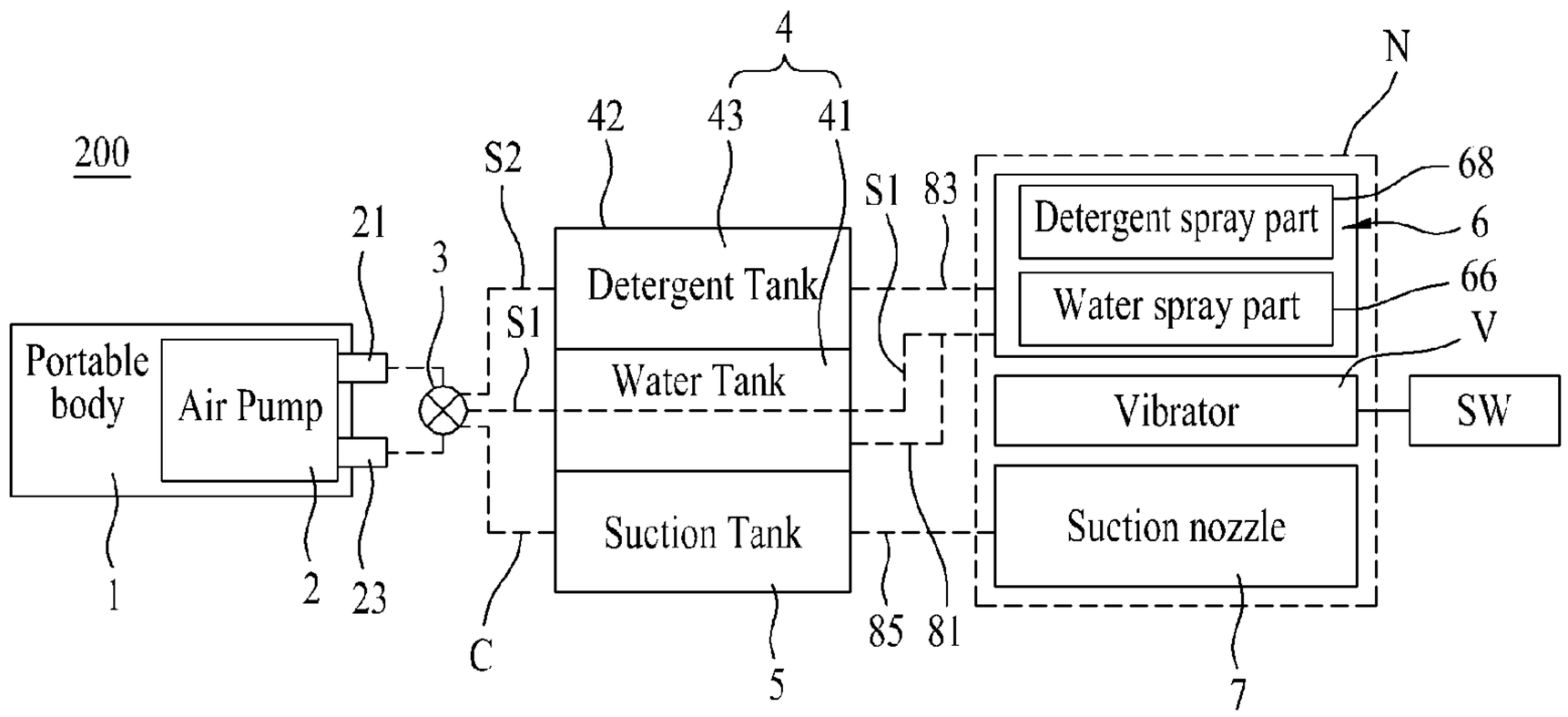
Portable body
Air Pump
Supply nozzle
6
V
Vibrator
SW
85
Suction nozzle
C
S
1
2
23
3
5
Suction Tank
7

(a)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S1
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Detergent Tank
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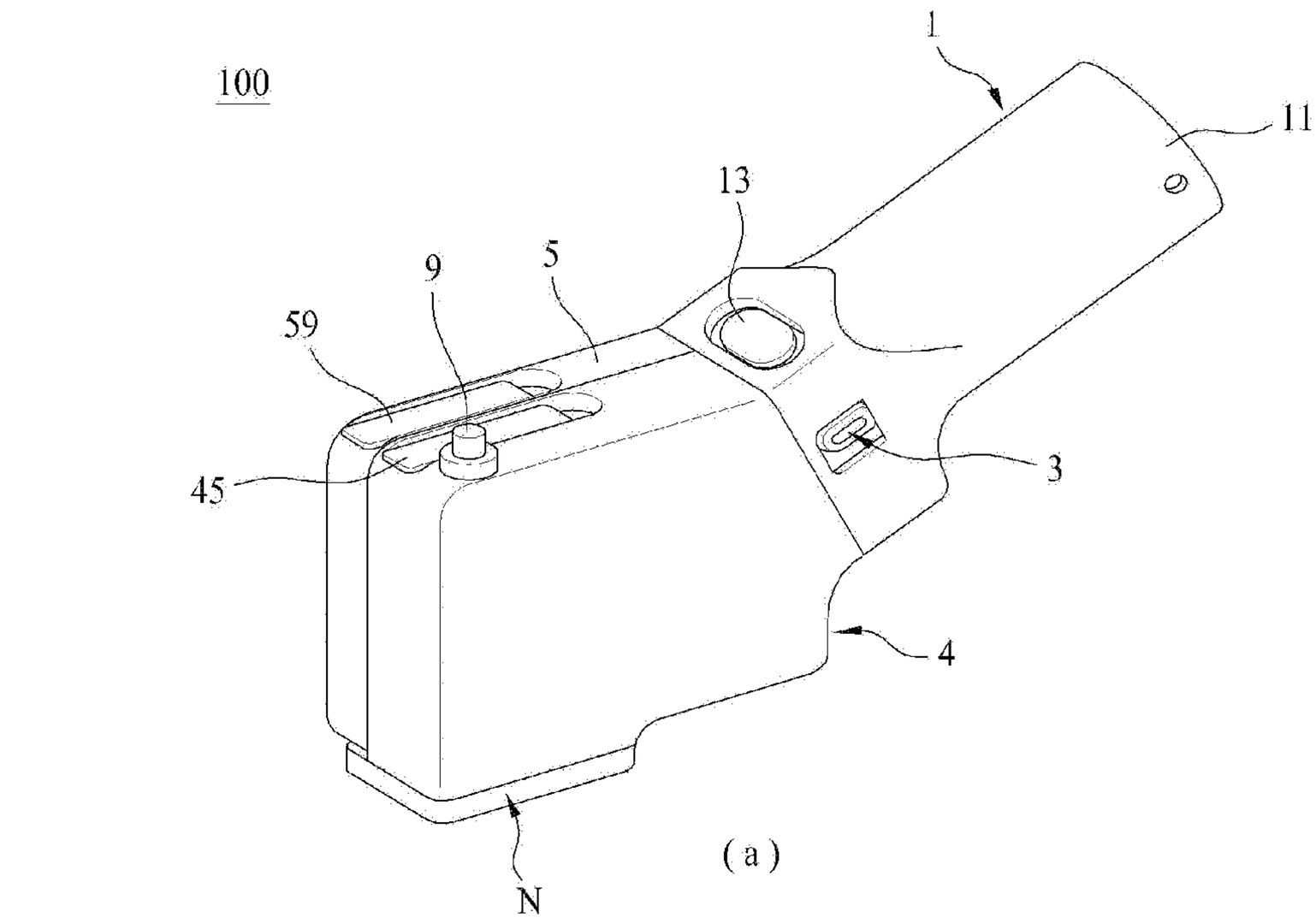
Water spray part
S1
V
Portable body
Air Pump
Water Tank
Vibrator
SW
Suction Tank
Suction nozzle
1
2
23
C
5
85
81
7

(b)

Fig. 2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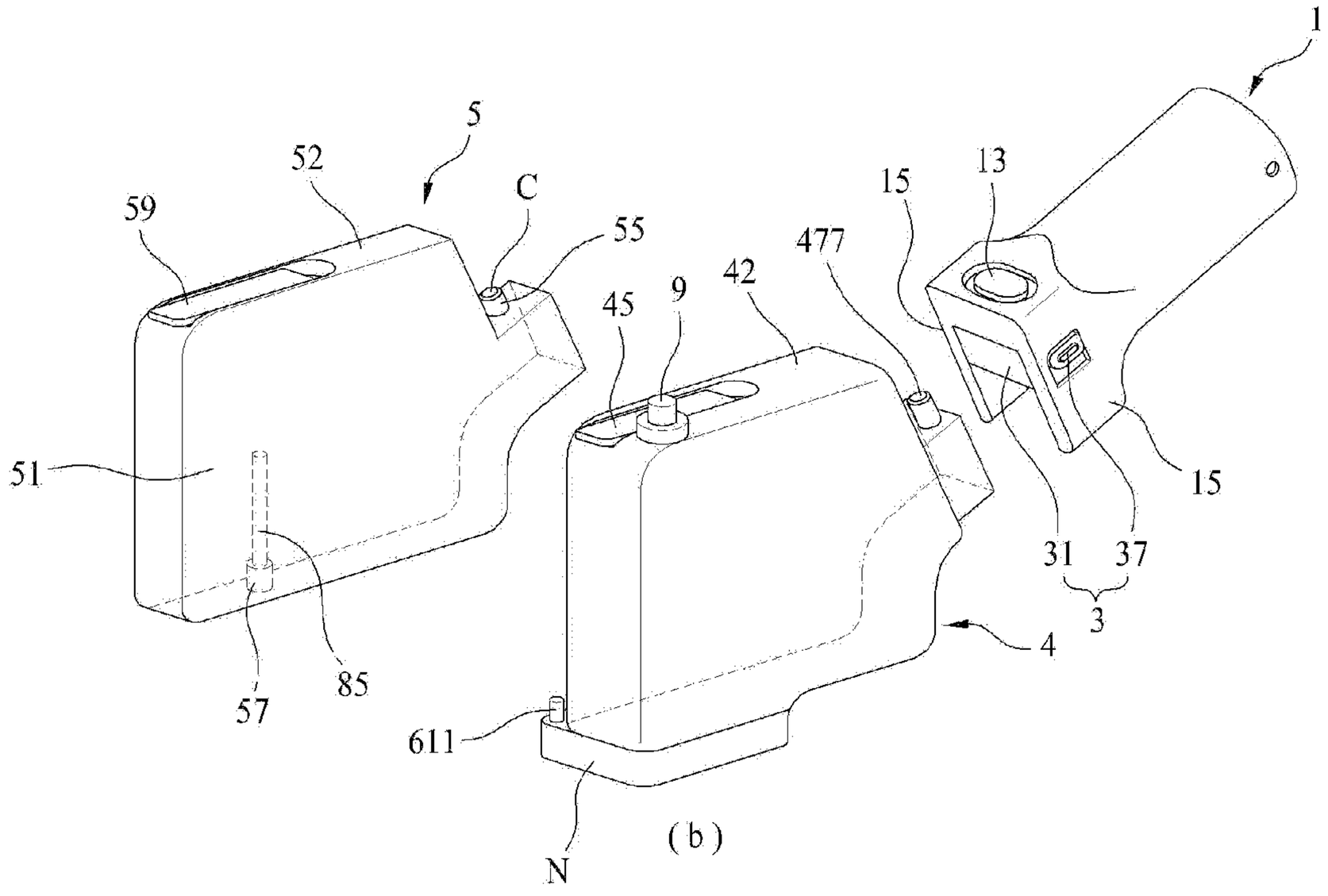
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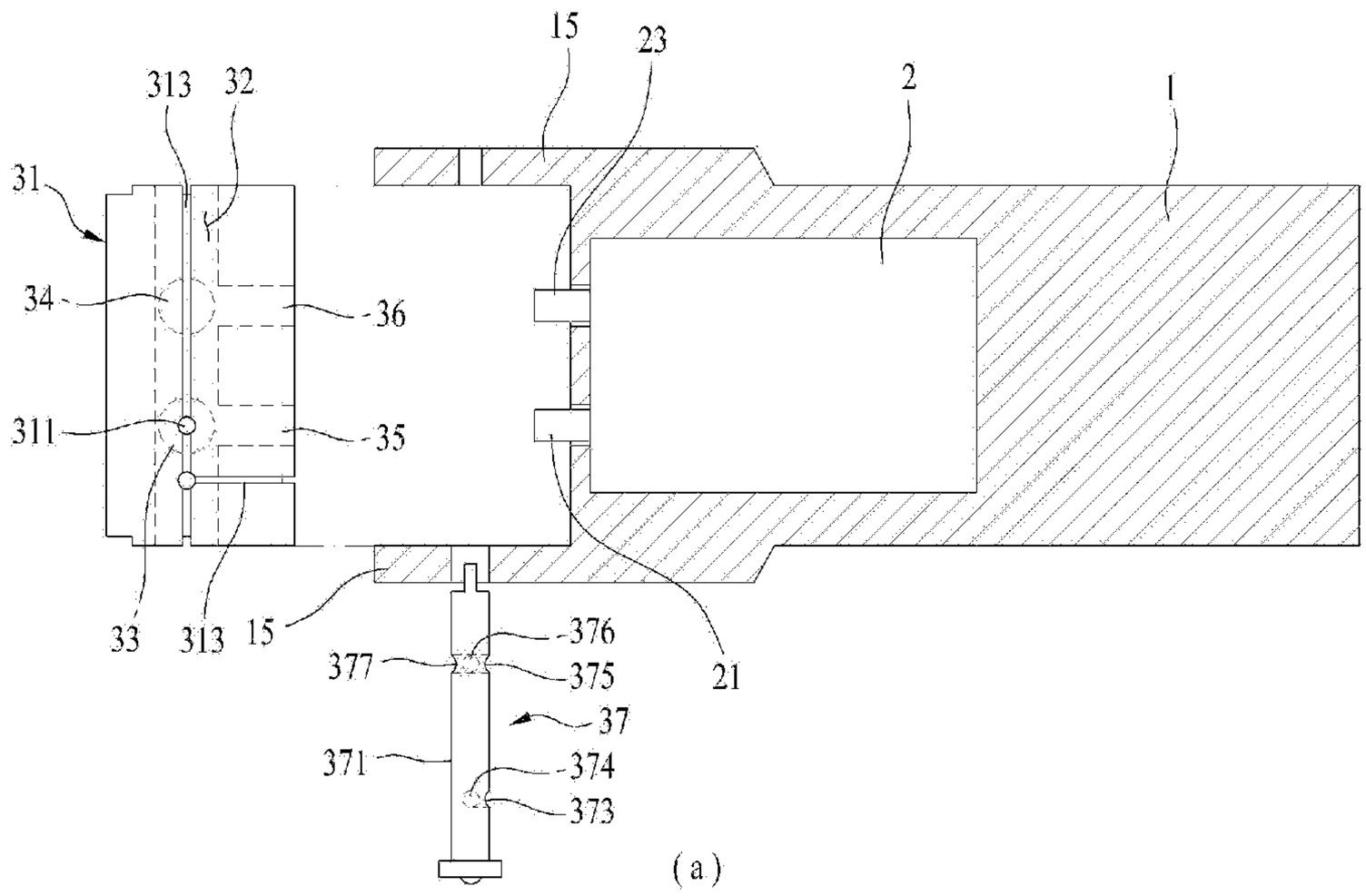
(b)

Fig. 3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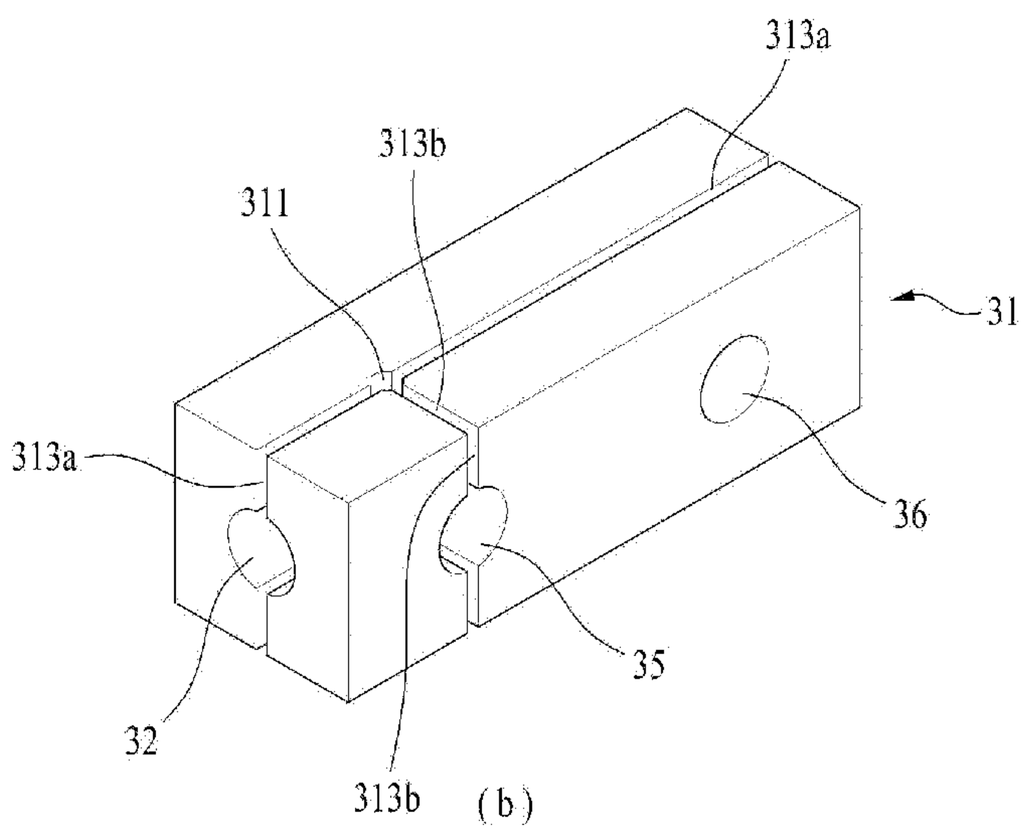
374
373

(a)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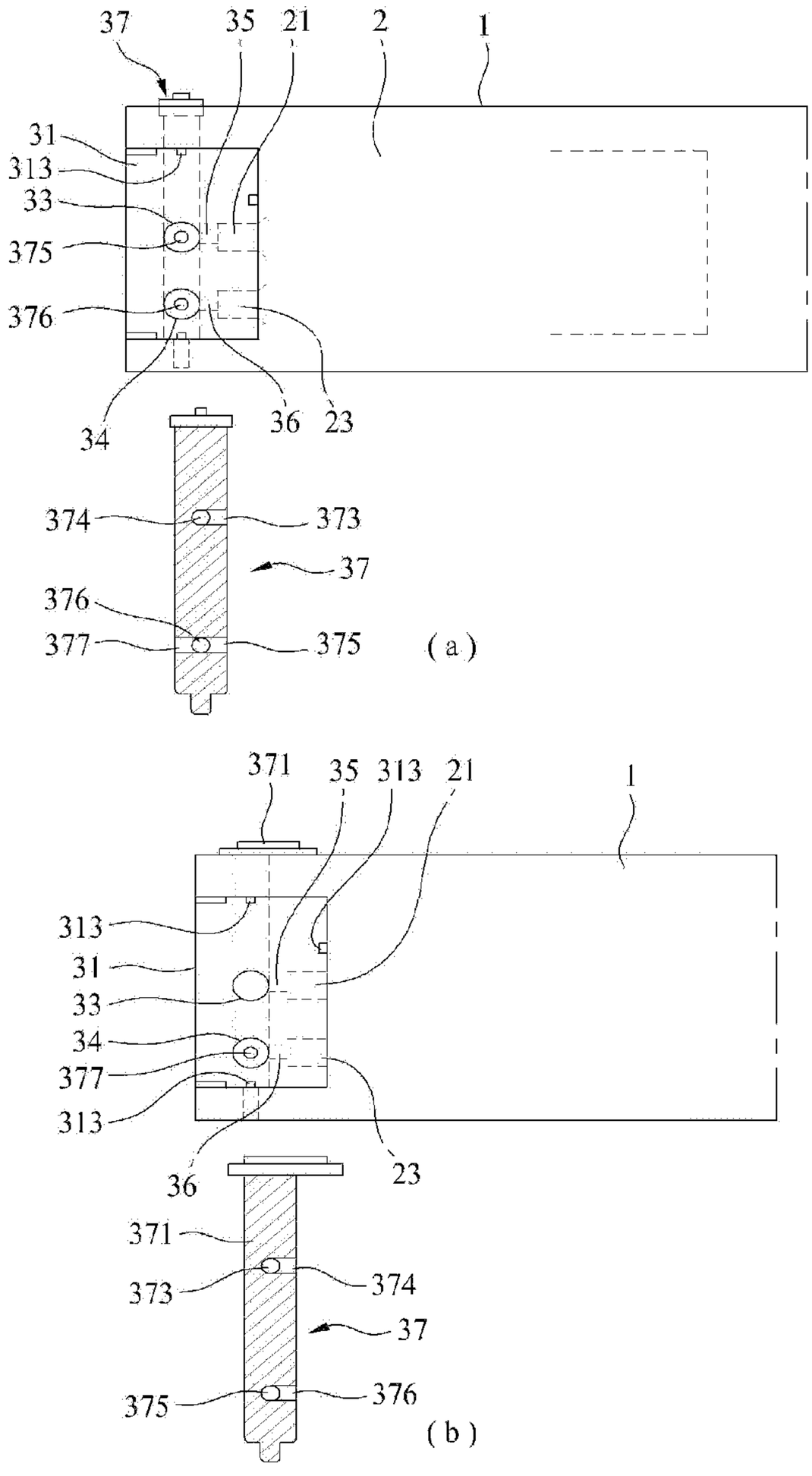
(b)

Fig. 4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371
35
313
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313
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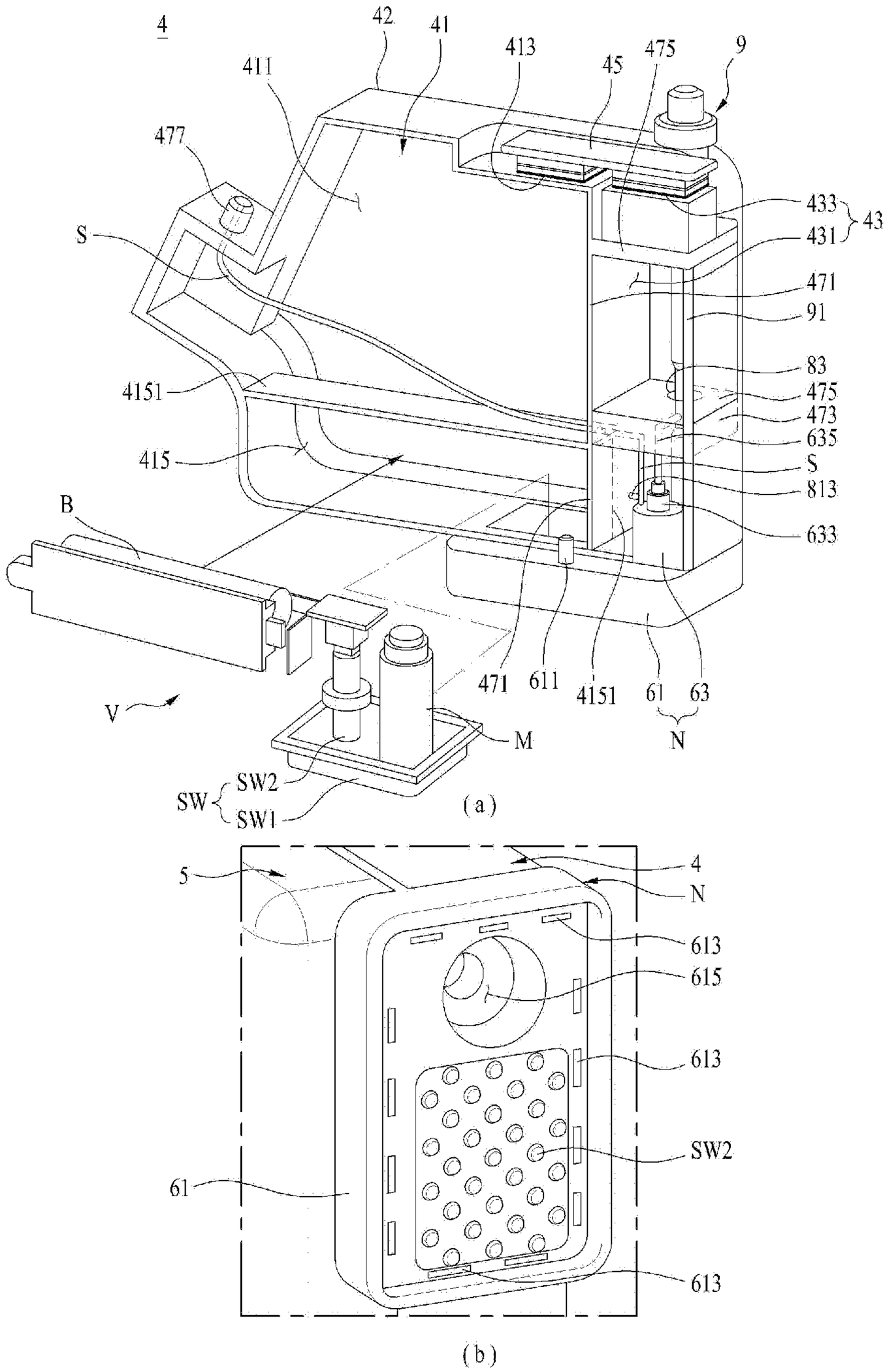
373
374
37
375
376
(b)

Fig. 5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S
813
B
633
471
611
4151
61
63
V
M
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SW2
SW
SW1
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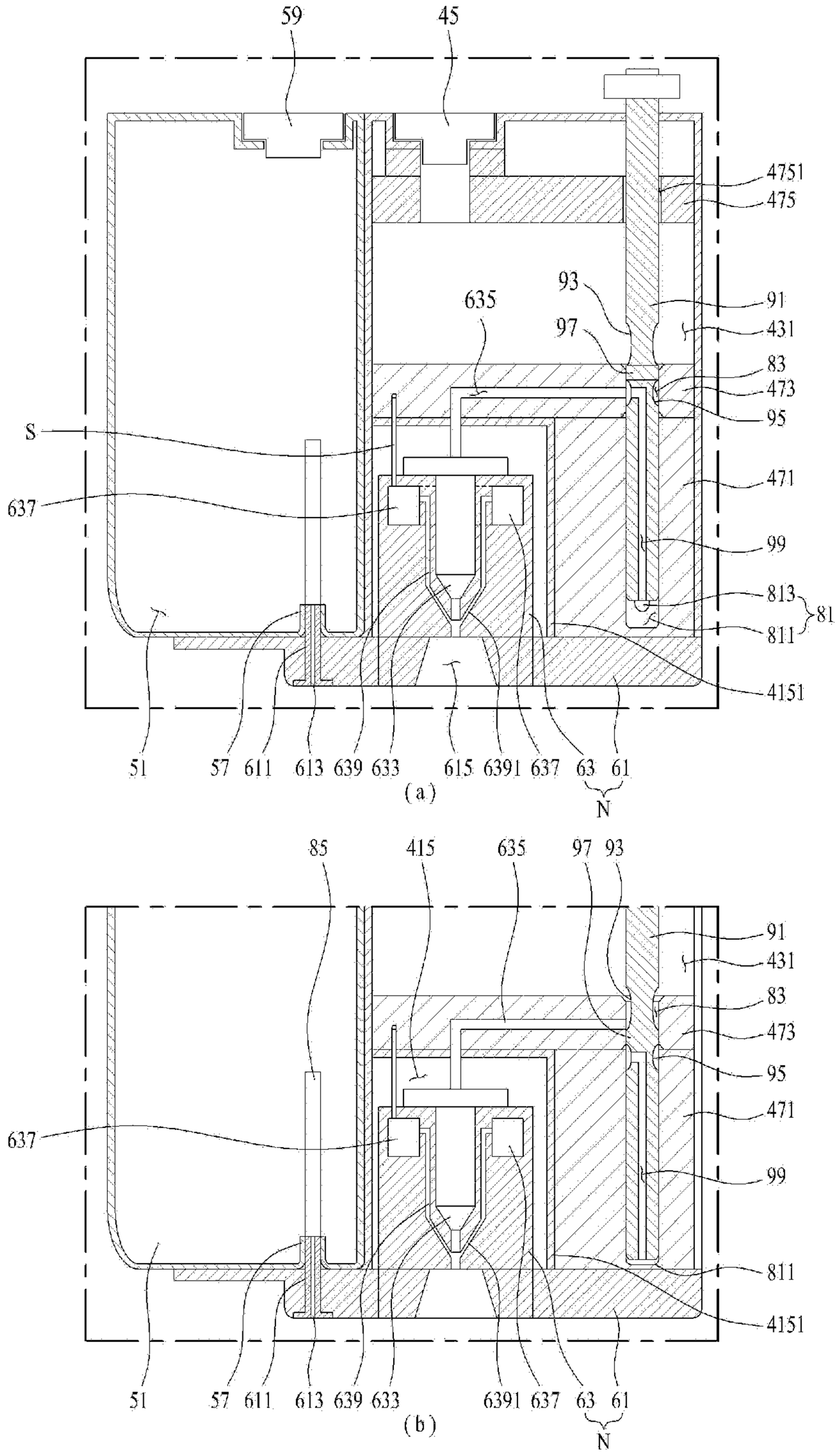
SW2
613
(b)

Fig. 6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431
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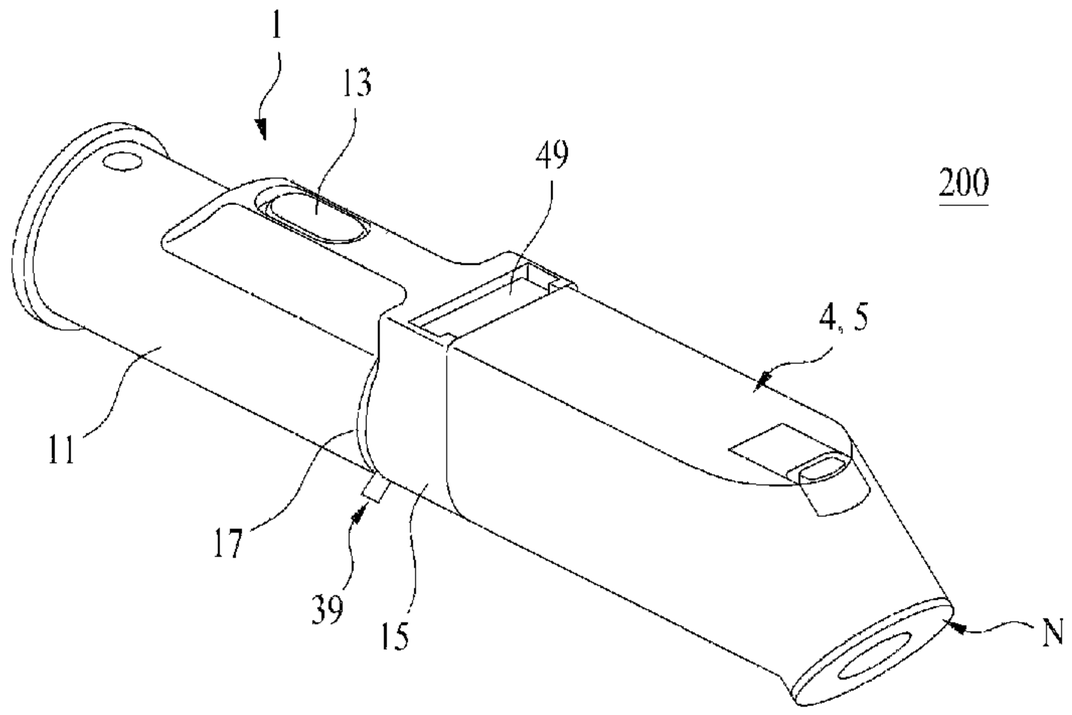
(b)

Fig. 7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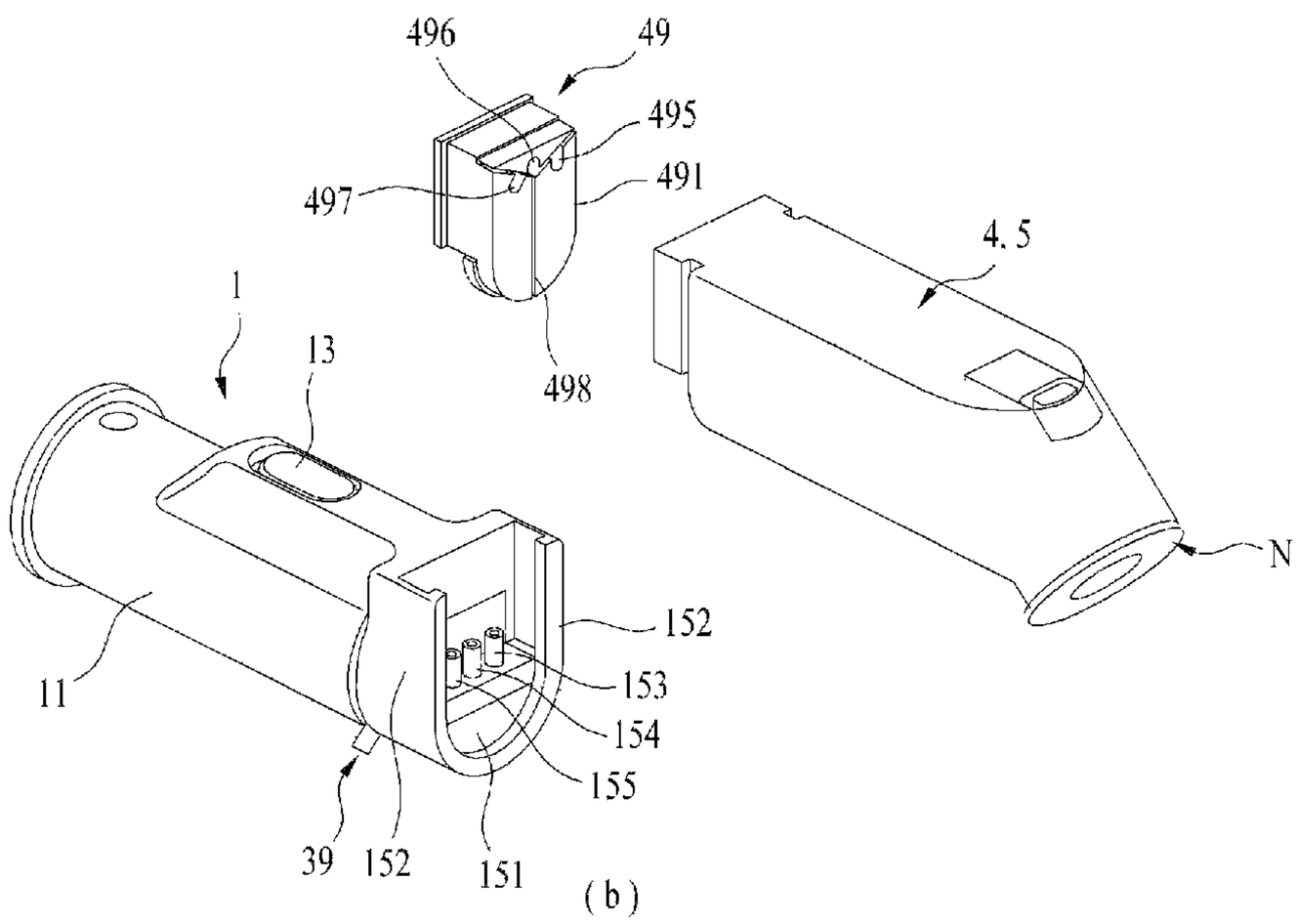
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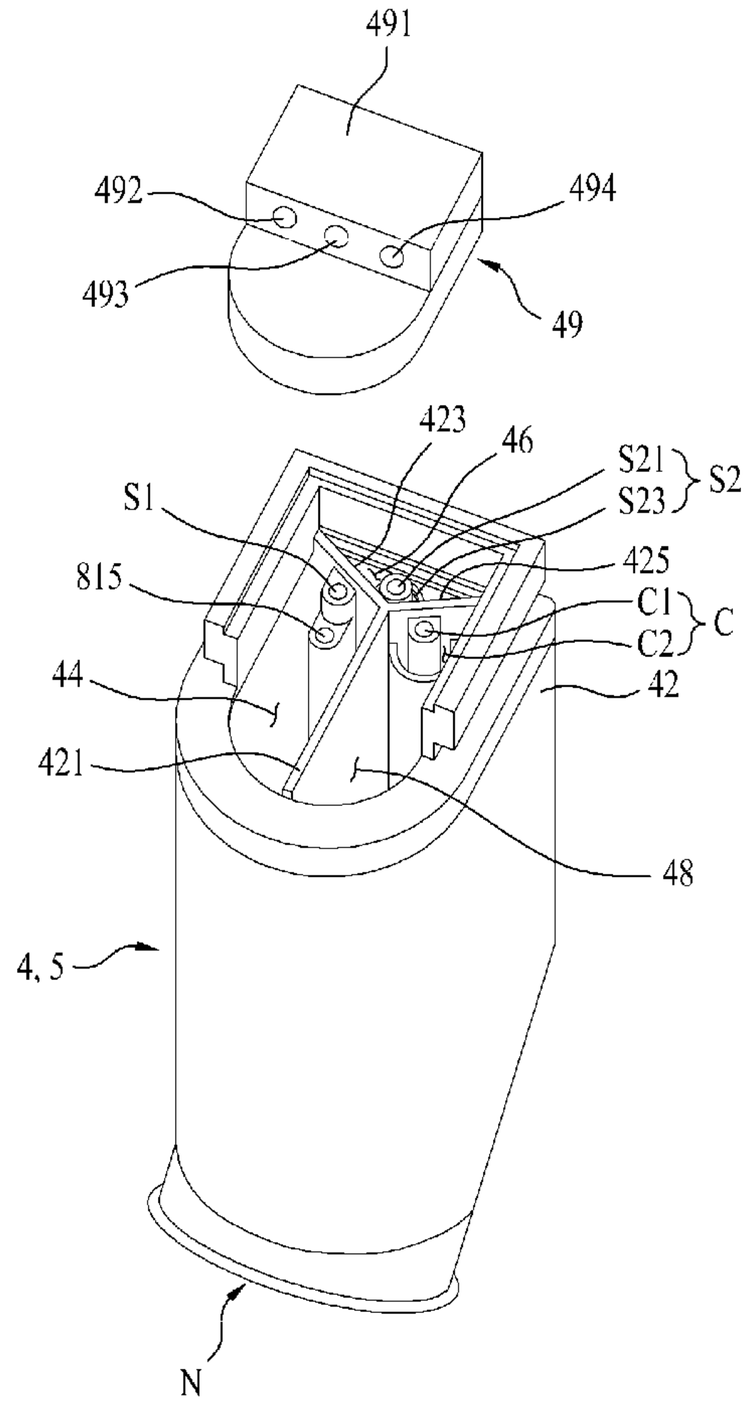
(b)

Fig. 8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421
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4, 5
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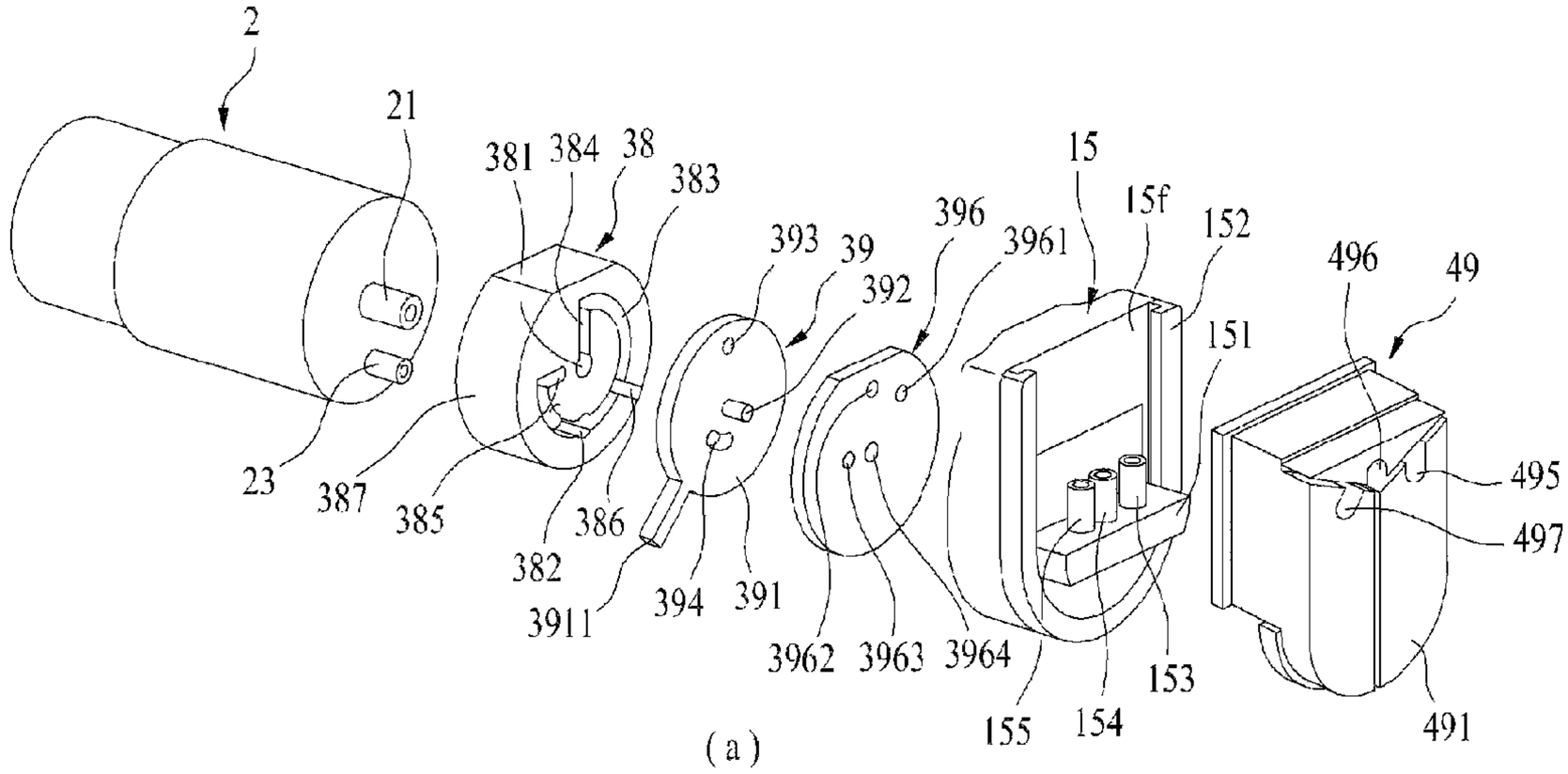
Fig. 9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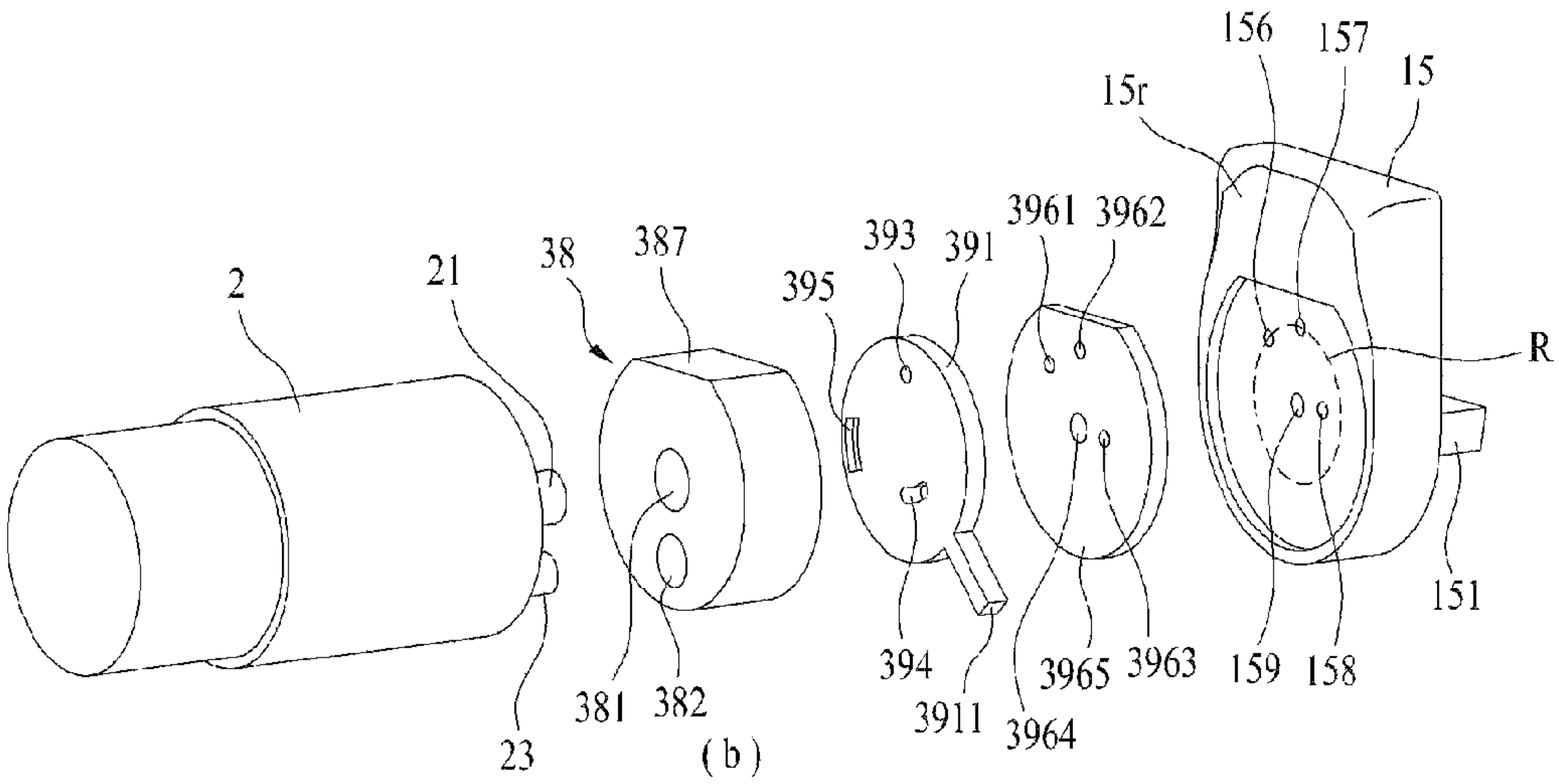
497
491

(a)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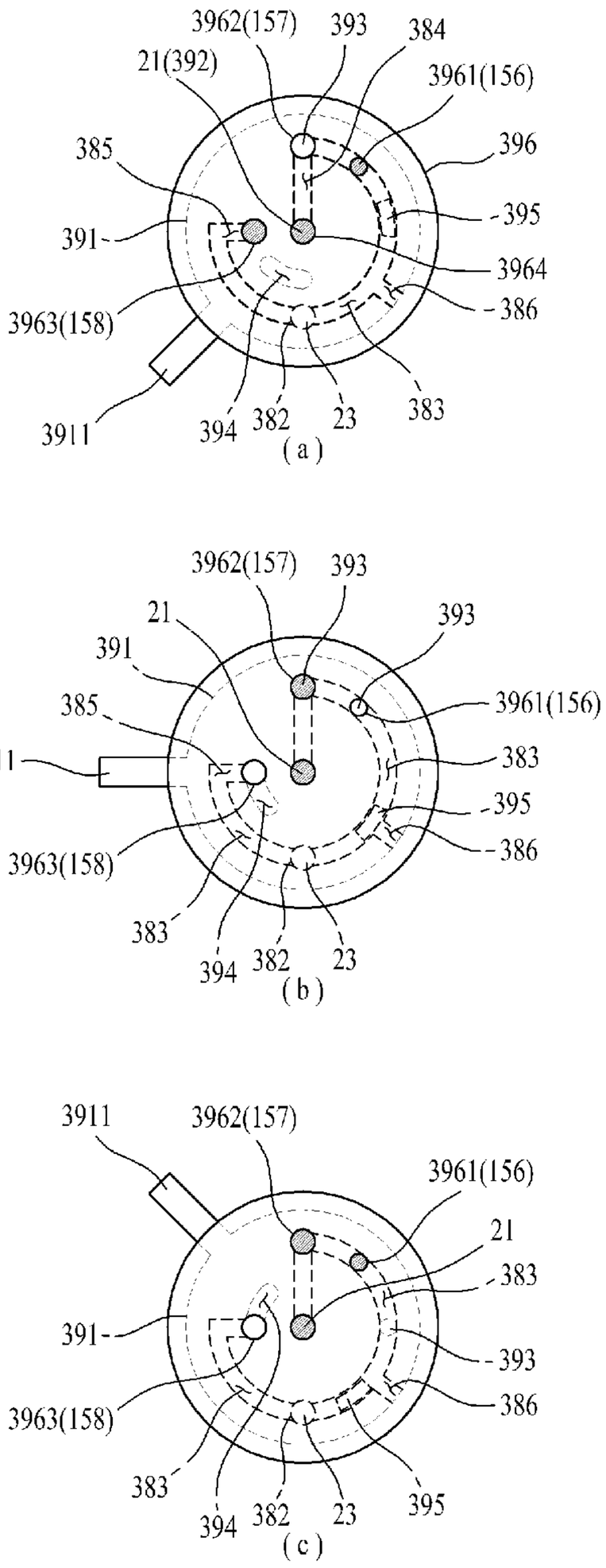
(b)

Fig. 10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3911
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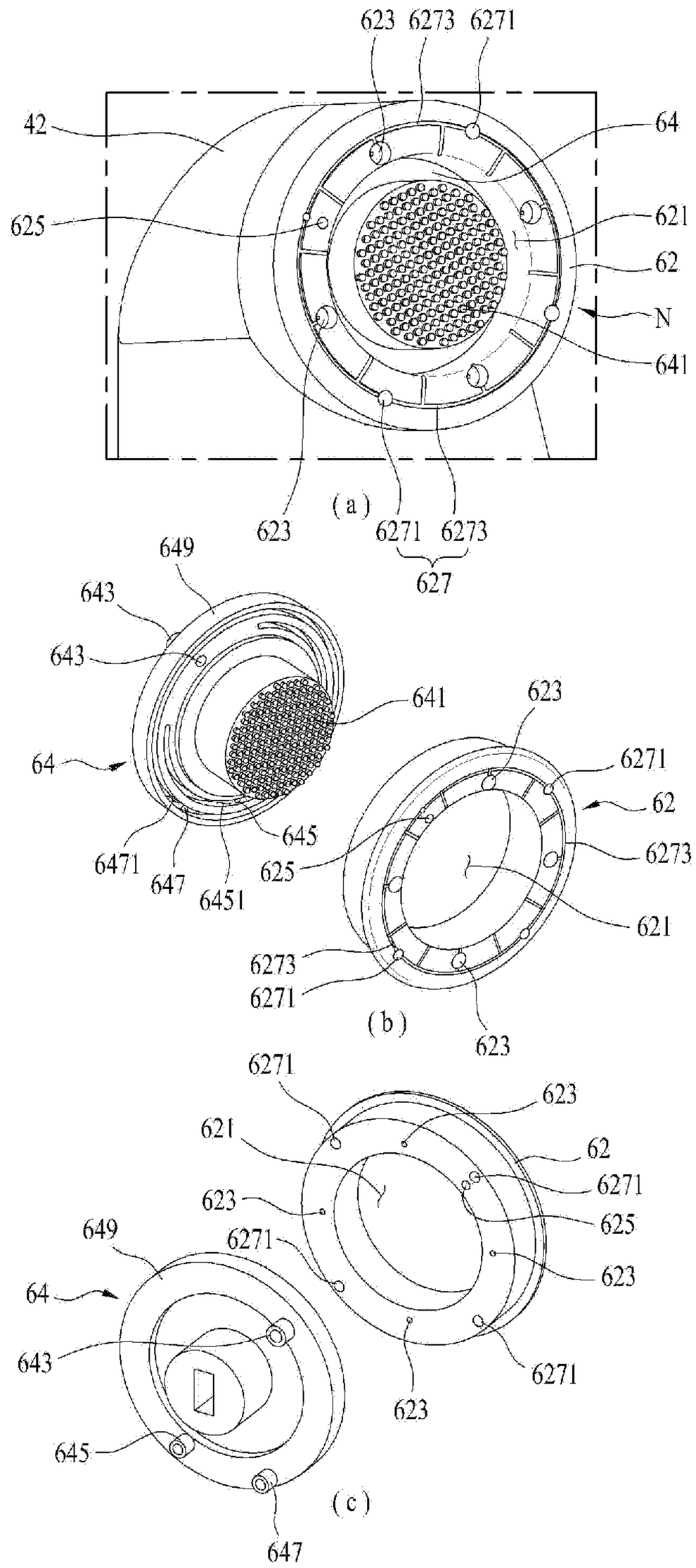
3963(158)
383
394
382
23
395
(c)

Fig. 11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(b)
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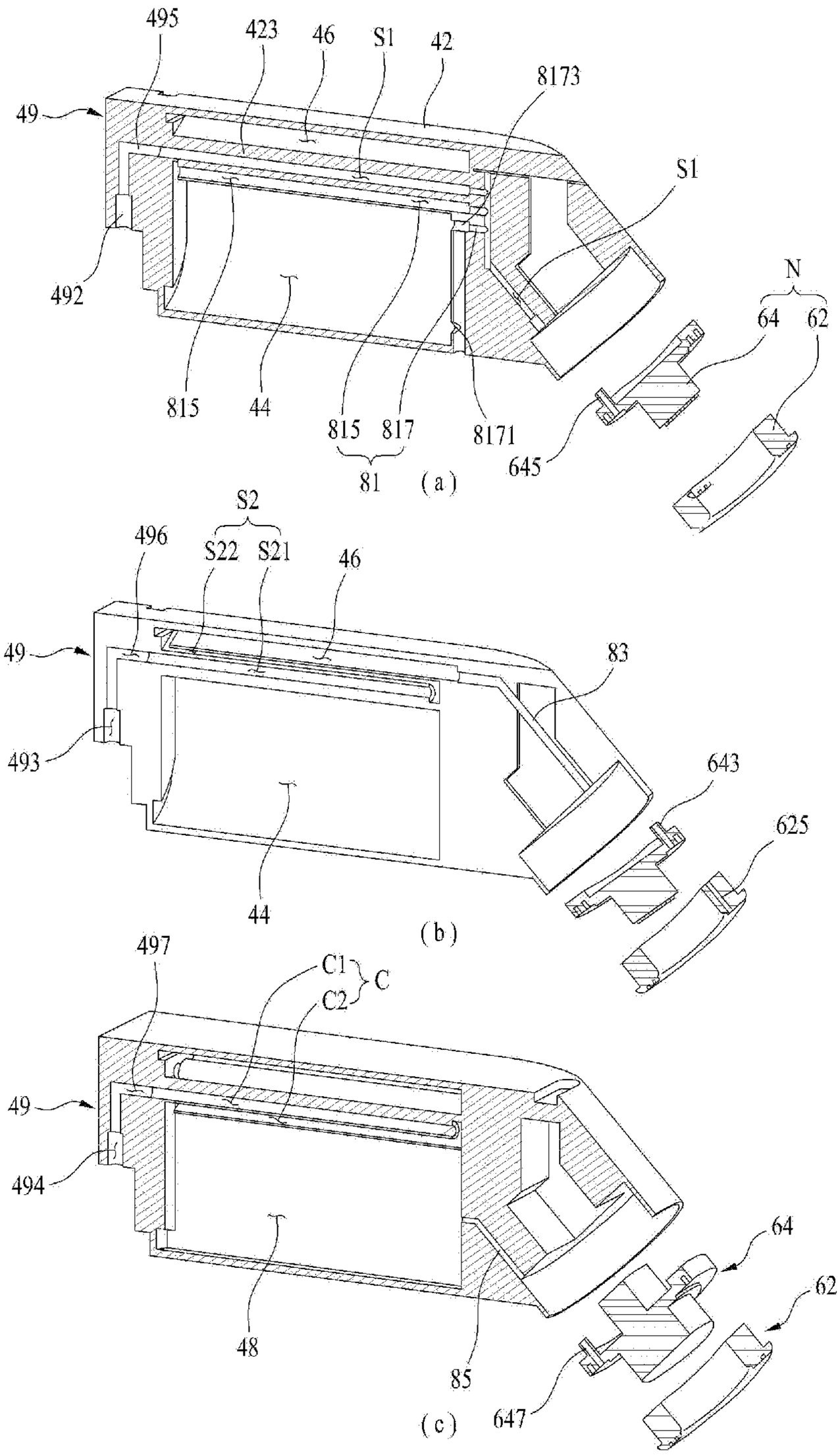
647
(c)

Fig. 12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49
83
493
643
625
44
(b)
497
C1
C
C2
49
494
64
62
48
85
647
(c)

PORTABLE LAUNDRY TREATING APPARATUS

This application claims the benefit of Korean Patent Application No. 10-2013-0063298, filed on Jun. 3, 2013, Korean Patent Application No. 10-2013-0063299, filed on Jun. 3, 2013, and Korean Patent Application No. 10-2013-0063300, filed on Jun. 3, 2013, which are hereby incorporated by reference as if fully set forth herein.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a portable laundry treating apparatus.

Discussion of the Related Art

In general, a laundry treating apparatus is a machine for removing various kinds of dirt from laundry by using a softening action of detergent, frictional force and impact of water circulation caused by rotation of a pulsator (or drum).

A conventional laundry treating apparatus includes a tub in which wash water is received and a drum which is rotatably provided in the tub and in which laundry is received. Such a conventional laundry treating apparatus performs a laundry washing operation by putting laundry into the drum, supplying wash water into the tub and rotating the drum.

However, even when only a portion of laundry is contaminated with dirt (i.e., laundry is contaminated locally), laundry should be put into the tub in which wash water is received (i.e., whole laundry should be immersed in wash water). Therefore, the above-described conventional laundry treating apparatus is inappropriate to remove dirt from laundry contaminated locally.

SUMMARY OF THE INVENTION

Accordingly, the present invention is directed to a portable laundry treating apparatus that substantially obviates one or more problems due to limitations and disadvantages of the related art.

An object of the present invention is to provide a portable laundry treating apparatus for removing dirt from laundry contaminated locally.

Another object of the present invention is to provide a portable laundry treating apparatus capable of spraying at least any one of detergent and wash water onto laundry and also sucking liquid from laundry.

Another object of the present invention is to provide a portable laundry treating apparatus that is small enough to be used or operated while being held in the hand of an operator.

Additional advantages, objects, and features of the invention will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The objectives and other advantages of the invention may be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

To achieve the object and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, a portable laundry treating apparatus comprises: a portable body; a supply tank in which at least any one of water and detergent is stored; a suction tank for providing a space in which liquid is stored; and a liquid transferring part for supplying liquid stored in the supply tank to laundry and transferring liquid remaining in laundry to the suction tank.

Also, there is provided a portable laundry treating apparatus comprising: a portable body; a supply tank removably coupled to the portable body to store at least any of water and detergent therein; a suction tank removably coupled to the portable body to provide a space for storing liquid therein; and a liquid transferring part for supplying liquid stored in the supply tank to laundry and transferring liquid remaining in laundry to the suction tank.

Also, there is provided a portable laundry treating apparatus comprising: a portable body; a supply tank in which at least any one of water and detergent is stored; a nozzle part by which the supply tank communicates with the outside; and a liquid transferring part communicating with the nozzle part to discharge liquid stored in the supply tank to the outside of the nozzle part by decreasing an internal pressure of the nozzle part.

Also, there is provided a portable laundry treating apparatus comprising: a portable body; a first chamber provided at the portable body to store any one of water and detergent therein; a tank body provided at the portable body; a second chamber provided in the tank body to provide a space for storing the other one of water and detergent therein; a suction tank provided in the tank body and including a suction chamber for providing a space to store liquid therein; and a liquid transferring part for supplying liquid stored in the first chamber and the second chamber to laundry and transferring liquid remaining in laundry to the suction tank.

Also, there is provided a portable laundry treating apparatus comprising: a portable body; a supply tank including a tank body provided at the portable body, a water chamber provided in the tank body to store water therein and a detergent chamber provided in the tank body to store detergent therein; a suction tank removably coupled to the portable body and including a suction chamber to store liquid therein; and a liquid transferring part for supplying liquid stored in the supply tank to laundry and transferring liquid remaining in laundry to the suction tank.

Also, there is provided a portable laundry treating apparatus comprising: a portable body; a liquid storage part including a tank body provided at the portable body, a water chamber provided in the tank body to store water therein; a detergent chamber provided in the tank body to store detergent therein and a suction chamber provided in the tank body to provide a space for storing liquid therein; and a liquid transferring part for supplying liquid stored in the water chamber and the detergent chamber to laundry and transferring liquid remaining in laundry to the suction chamber.

As is apparent from the above description, the portable laundry treating apparatus can remove dirt from laundry contaminated locally.

Further, the portable laundry treating apparatus can spray at least any one of detergent and wash water onto laundry and also can suck liquid from laundry.

It is to be understood that both the foregoing general description and the following detailed description of the present invention are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate

embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

FIG. **1** is a view illustrating a portable laundry treating apparatus according to the present invention;

FIG. **2** is a view illustrating an exemplary embodiment of the portable laundry treating apparatus according to the present invention;

FIGS. **3** and **4** are views illustrating a structure of a channel valve of the portable laundry treating apparatus depicted in FIG. **2**;

FIG. **5** is a view illustrating a supply tank and a nozzle part of the portable laundry treating apparatus depicted in FIG. **2**;

FIG. **6** is a sectional view of a tank valve and a nozzle part of the portable laundry treating apparatus depicted in FIG. **2**;

FIG. **7** is a view illustrating another exemplary embodiment of the portable laundry treating apparatus according to the present invention;

FIG. **8** is a view illustrating a liquid storage part of the portable laundry treating apparatus depicted in FIG. **7**;

FIGS. **9** and **10** are views illustrating a channel valve of the portable laundry treating apparatus depicted in FIG. **7**;

FIG. **11** is a view illustrating a nozzle part of the portable laundry treating apparatus depicted in FIG. **7**; and

FIG. **12** is a view illustrating an air supply channel, an air suction channel, a water channel, a detergent channel and a suction channel of the portable laundry treating apparatus depicted in FIG. **7**.

DETAILED DESCRIPTION OF THE INVENTION

Now, preferred embodiments of the present invention will be described in detail with reference to the annexed drawings. The preferred embodiments described in the specification and shown in the drawings are illustrative only and are not intended to represent all aspects of the invention, and like numbers refer to like elements throughout the description of the figures.

A portable laundry treating apparatus **100** or **200** of the present invention is a machine for removing local contamination from laundry (e.g. clothes), only a portion of which is stained, and has a hand-held structure that is small enough to be used or carried while being held in the hand of an operator.

Particularly, a portable laundry treating apparatus of the present invention has characteristics of supplying at least any one of detergent and water to a contaminated area of laundry and sucking liquid (water, detergent, dirt and the like) from laundry.

FIG. **1***a* is a view illustrating a portable laundry treating apparatus according to an exemplary embodiment of the present invention. A portable laundry treating apparatus **100** according to the embodiment of the present invention comprises a portable body **1** which can be carried by hand, a supply tank **4** in which at least any one of water and detergent is stored, a suction tank **5** which provides a space for storing (or sucking) liquid, and a liquid transferring part which supplies liquid stored in the supply tank **4** to a contaminated area of laundry and sucks liquid remaining in laundry to the suction tank **5**.

The supply tank **4**, as shown in FIG. **1***a*, may preferably include a water tank **41** in which water is stored and a detergent tank **43** in which liquid detergent is stored. However, the supply tank **4** may include only any one of the water tank **41** and the detergent tank **43**. For convenience of explanation, the supply tank **4** including both the water tank **41** and the detergent tank **43** will be explained hereinafter. The supply tank **4** may be fixedly coupled to the portable body **1**; however, it is preferable that the supply tank **4** is removably coupled to the portable body **1**. In the case of the latter, the supply tank **4** may include a tank body **42** removably coupled to the portable body **1**, and a partition wall provided in the tank body **42** in order to separate the water tank **41** and the detergent tank **43** from each other.

Preferably, the portable body **1** may be further provided with a tank support part (not shown) to which the tank body **42** is removably coupled.

The suction tank **5** serves to provide a space for storing liquid. The suction tank **5** may be fixedly coupled to the portable body **1**. However, similar to the supply tank **4**, it is preferable that the suction tank **5** is removably coupled to the portable body **1** using a tank mounting part (not shown).

The liquid transferring part serves to discharge liquid from the water tank **41** and the detergent tank **43** and also to suck liquid existing outside the suction tank **5** (liquid remaining in laundry) into the suction tank **5**. The liquid transferring part may be formed in various types so long as the above-described functions can be achieved.

FIG. **1***a* illustrates an example of the liquid transferring part, which includes an air pump **2** and a plurality of flow channels **8**, **81**, **83**, **85**, S and C for connecting the air pump **2** to a nozzle part N and the liquid tanks **4** and **5**.

The air pump **2** includes a discharge port **21** through which air is discharged from the air pump **2** and a suction port **23** through which air is sucked into the air pump **2**. Such an air pump **2** may be fixedly coupled to the portable body **1**. The air pump **2** serves to discharge liquid from the supply tank **4** to laundry and to suck liquid from laundry into the suction tank **5** through the nozzle part N communicating with the respective tanks **41**, **43** and **5**.

The nozzle part N may include a supply nozzle **6** through which liquid stored in the water tank **41** and the detergent tank **43** is sprayed, and a suction nozzle **7** through which liquid existing outside the suction tank **5** is introduced into the suction tank **5**.

The supply nozzle **6** is connected to the discharge port **21** of the air pump **2** through an air supply channel S and is also connected to the water tank **41** and the detergent tank **43** through a discharge channel **8**.

The discharge channel **8** may include a water channel **81** for connecting the supply nozzle **6** and the water tank **41**, and a detergent channel **83** for connecting the supply nozzle **6** and the detergent tank **43**.

Therefore, air discharged from the discharge port **21** of the air pump **2** is discharged to the outside of the portable laundry treating apparatus **100** via the air supply channel S and the supply nozzle **6**. If air is discharged from the supply nozzle **6**, an internal pressure of the supply nozzle **6** gets lower than an internal pressure of the water tank **41** and the detergent tank **43**. Accordingly, liquid in the water tank **41** and the detergent tank **43** flows to the supply nozzle **6** through the discharge channel **8** and is sprayed onto laundry together with air.

The water channel **81** and the detergent channel **83** are preferably connected to a junction part **6391** at which the air supply channel S and the supply nozzle **6** are connected. A cross-sectional area of the junction part **6391** is preferably smaller than a cross-sectional area of channels disposed upstream and downstream of the junction part **6391**. In the above structure, liquid stored in the supply tank **4** can be easily discharged to the supply nozzle **6** by a venturi effect.

The discharge channel **8** may be provided with a tank valve **9** to selectively supply water stored in the water tank **41** and detergent stored in the detergent tank **43**. In the case in which the water channel **81** and the detergent channel **83** are branched from a single channel connected to the supply nozzle **6** and are respectively connected to the water tank **41** and the detergent tank **43**, the tank valve **9** may be disposed at a branching point (or junction point) of the water channel and the detergent channel **83**. The tank valve **9** may be configured to supply any one of water and detergent to the supply nozzle **6** or to supply water and detergent to the supply nozzle **6** at the same time.

The suction tank **5** is connected to the suction port **23** of the air pump **2** through an air suction channel C, and is connected to the suction nozzle **7** through a suction channel **85**. Therefore, if air in the suction tank **5** moves to the air pump **2** through the suction port **23**, an internal pressure of the suction tank **5** decreases, and liquid existing outside the suction nozzle **7** (water, detergent and dirt remaining in laundry) moves to the suction tank **5** through the suction channel **85**.

The portable laundry treating apparatus **100** according to the present invention may further include a channel valve **3** for controlling opening/closing of the air supply channel S and the air suction channel C. The channel valve **3** may be configured to open the air supply channel S and the air suction channel C at the same time or to open only any one of the air supply channel S and the air suction channel C. If both the air supply channel S and the air suction channel C are opened, the portable laundry treating apparatus **100** of the present invention operates such that at least any one of water and detergent is supplied to laundry and at the same time liquid remaining in laundry is sucked into the suction tank **5**. However, if only the air supply channel S is opened by the channel valve **3**, the portable laundry treating apparatus **100** of the present invention operates only to supply at least any one of water and detergent to laundry. If only the air suction channel C is opened by the channel valve **3**, the portable laundry treating apparatus **100** of the present invention operates only to suck liquid remaining in laundry into the suction tank **5**.

In the case in which only the air supply channel S is opened, external air of the portable body **1** should be supplied to the liquid transferring part though the suction port **23** of the air pump **2**. In the case in which only the air suction channel C is opened, air discharged from the discharge port **21** of the air pump **2** should be discharged to the outside of the portable body **1**. Therefore, the channel valve **3** may be preferably provided with a channel for supplying external air to the suction port **23** of the air pump **2** when only the air supply channel S is opened and a channel for communicating the discharge port **21** of the air pump **2** with external air when only the air suction channel C is opened.

The portable laundry treating apparatus **100** according to the present invention may further include a vibration part V for vibrating the nozzle part N. The nozzle part N is a component which is supposed to contact laundry. If the nozzle part N is vibrated by the vibration part V, absorption of water or detergent supplied from the supply nozzle **6** to laundry can be promoted, and dirt separated from laundry by detergent or water can be easily sucked by the suction nozzle **7**. The vibration part V may be configured to vibrate only any one of the supply nozzle **6** and the suction nozzle **7** or to vibrate both the supply nozzle **6** and the suction nozzle **7**. In the case of the latter, the nozzle part N includes a nozzle body to which the supply nozzle and the suction nozzle are fixedly coupled, and the vibration part V is configured to vibrate the nozzle body. In this case, the nozzle body is fixedly coupled to any one of the supply tank **4** and the suction tank **5**, and the other one of the supply tank **4** and the suction tank **5** is removably coupled to the nozzle body.

Further, the vibration part V may be configured to be activated when the nozzle body is pressurized by laundry (or contacts laundry). For this, a vibration part switch SW may be provided at a surface of the nozzle part N (or surface of the nozzle body).

FIG. **1***b* is a view illustrating a portable laundry treating apparatus according to another exemplary embodiment of the present invention.

A portable laundry treating apparatus **200** according to this embodiment comprises a portable body **1**, liquid storage parts **4** and **5** including a space in which liquid has been stored (space in which liquid to be supplied to laundry has been stored) and a space in which liquid will be stored (space into which liquid will be sucked), and a liquid transferring part to supply liquid stored in the liquid storage part **4** to laundry and to transfer liquid remaining in laundry to the liquid storage part **5**.

The liquid storage parts may include a tank body **42** which is removably coupled to the portable body **1**, a supply tank **4** which is provided in the tank body **42** and in which at least any one of water and detergent is stored, and a suction tank **5** which is provided in the tank body **42** and into which liquid existing outside the tank body **42** is sucked. In the case in which the supply tank **4** has a structure capable of storing both water and detergent, a plurality of partition walls for separating the water tank **41**, the detergent tank **43** and the suction tank **5** from each other are provided in the tank body **42**.

The portable laundry treating apparatus **200** according to this embodiment further includes a supply nozzle **6** communicating with the water tank **41** and the detergent tank **43**, and a suction nozzle **7** communicating with the suction tank **5**. The nozzle part N may be fixedly coupled to the tank body **42**. The supply nozzle **6** may include a water spray part **66** communicating with the water tank **41** and a detergent spray part **68** communicating with the detergent tank **43**.

In such a case, the liquid transferring part may include an air pump **2** including a discharge port **21** through which air is discharged from the air pump **2** and a suction port **23** through which air is sucked into the air pump **2**, and a plurality of channels S**1**, S**2**, C, **81**, **82** and **83** for connecting the air pump **2** to the liquid storage parts **4** and **5** and the nozzle part N.

In detail, the discharge port **21** of the air pump **2** is connected to the water spray part **66** through a first air supply channel S**1** and is connected to the detergent tank **43** through a second air supply channel S**2**. The suction port **23** of the air pump **2** is connected to the suction tank **5** through an air suction channel C.

The water tank **41** is connected to the water spray part **66** through a water channel **81**, the detergent tank **43** is connected to the detergent spray part **68** through a detergent channel **83**, and the suction tank **5** is connected to the suction nozzle **7** through a suction channel **85**.

Accordingly, if air is supplied to the water spray part **66** through the first air supply channel S**1**, water stored in the water tank **41** is sprayed onto laundry via the water channel **81** and the water spray part **66**. If air is supplied to the detergent tank **43** through the second air supply channel S**2**, detergent is supplied to laundry via the detergent channel **83** and the detergent spray part **68**.

If air in the suction tank **5** moves to the suction port **23** of the air pump **2** through the air suction channel C, liquid

remaining in laundry moves to the suction tank **5** via the suction nozzle **7** and the suction channel **85**.

The portable laundry treating apparatus **200** according to the present invention may perform all of the above-described processes (the first supply channel, the second supply channel and the air suction channel are all opened) while a user operates the liquid transferring part. Alternatively, the portable laundry treating apparatus **200** may operate to open at least any one of the first air supply channel S**1**, the second air supply channel S**2** and the air suction channel C using the channel valve **3**.

The channel valve **3** may be configured to open only any one of the first air supply channel S**1**, the second air supply channel S**2** and the air suction channel C. The channel valve **3** may also be configured to open the air suction channel C and any one of the first air supply channel S**1** and the second air supply channel S**2**. The channel valve **3** may also be configured to open only the first air supply channel S**1** and the second air supply channel S**2**. To achieve this, the channel valve **3** is disposed between the air pump **2** and the channels S**1**, S**2** and C.

The portable laundry treating apparatus **200** according to this embodiment may further include a vibration part V for vibrating the nozzle part N. The vibration part V may be configured to vibrate only any one of the supply nozzle **6** and the suction nozzle **7** or to vibrate both the supply nozzle **6** and the suction nozzle **7**. In the case of the latter, the nozzle part N includes a nozzle body which is fixedly coupled to the tank body **42** and supports the supply nozzle and the suction nozzle, and the vibration part V is configured to vibrate the nozzle body. The vibration part V may be configured to be activated when the nozzle body is pressurized by laundry (or contacts laundry). In this case, a switch SW for operating the vibration part V may be provided at a surface of the nozzle body.

FIGS. **2** through **6** are views illustrating an example of the portable laundry treating apparatus **100** depicted in FIG. **1***a*.

As described above, the portable laundry treating apparatus **100** according to this embodiment includes a portable body **1**, a supply tank **4** in which at least any one of detergent and water is stored, a suction tank **5** which provides a space capable of storing liquid, a nozzle part N which communicates with the supply tank **4** and the suction tank **5**, and a liquid transferring part which is provided at the portable body **1** in order to supply liquid stored in the supply tank **4** to laundry through the nozzle part N and to suck liquid remaining in laundry to the suction tank **5** through the nozzle part N.

The portable body **1** includes a handle **11** which a user can grab to carry the portable laundry treating apparatus **100** of the present invention, and a switch **13** for controlling operation of the liquid transferring part, and more particularly controlling operation of the air pump.

In the case in which the supply tank **4** and the suction tank **5** are removably provided at the portable body **1**, the portable body **1** may be further provided with a tank support part **15** to which the supply tank **4** and the suction tank **5** are removably coupled.

The liquid transferring part may include an air pump **2** and channels for connecting the air pump **2** to the nozzle part N and the liquid storage parts **4** and **5**.

As shown in FIG. **3**, the air pump **2** is fixedly provided in the portable body **1**, and includes a discharge port **21** through which air is discharged from the air pump **2** and a suction port **23** through which air is sucked into the air pump **2**. The discharge port **21** and the suction port **23** of the air pump **2** are exposed to the outside of the portable body **1** through a space defined by a pair of tank support parts **15** which are provided opposite to each other at the portable body **1**, and are connected to a channel valve **3**.

The channel valve **3** serves to open and close the discharge port **21** and the suction port **23** of the air pump **2** (open and close the air supply channel S and the air suction channel C). The channel valve **3** includes a valve support body **31** fixedly coupled to the portable body **1**, a support body through-hole **32** which is formed through the valve support body **31**, a discharge port connection pipe **35** for connecting the support body through-hole **32** to the discharge port **21** of the air pump, a suction port connection pipe **36** for connecting the support body through-hole **32** to the suction port **23** of the air pump, a supply channel connection pipe **33** for connecting the support body through-hole **32** to the air supply channel S, a suction channel connection pipe **34** for connecting the support body through-hole **32** to the air suction channel C, and a valve **37** which is rotatably provided in the support body through-hole **32** and controls opening/closing of the connection pipes **35**, **36**, **33** and **34**.

The valve **37** includes a body **371** which penetrates the tank support part **15** and is inserted into the support body through-hole **32**, a first body channel **373** which communicates with the discharge port connection pipe **35** and extends toward the inside of the body **371**, a second body channel **374** which communicates with the supply channel connection pipe **33** and is connected to the first body channel **373**, a third body channel **375** which communicates with the suction port connection pipe **36** and extends toward the inside of the body **371**, and a fourth body channel **376** which communicates with the suction channel connection pipe **34** and is connected to the third body channel **375**.

As illustrated in FIG. **3**, the discharge port connection pipe **35** and the supply channel connection pipe **33** may be arranged at an angle of about 90 degrees with respect to each other. In this case, the first body channel **373** and the second body channel **374** are also arranged at an angle of about 90 degrees with respect to each other.

Since the suction port connection pipe **36** and the suction channel connection pipe **34** are arranged at an angle of about 90 degrees with respect to each other, the third body channel **375** and the fourth body channel **376** are also arranged at an angle of about 90 degrees with respect to each other.

The valve **37** may further include a fifth body channel **377** which is formed in the body **371** and is connected to the first body channel **373** or the third body channel **375**. By the fifth body channel **377**, only the discharge port connection pipe **35** is connected to the supply channel connection pipe **33**, or only the suction port connection pipe **36** is connected to the suction channel connection pipe **34**.

As illustrated in FIG. **3**, the fifth body channel **377** may be connected to the third body channel **375** and the fourth body channel **376**. In this case, the fifth body channel **377** is connected to a junction point of the third body channel **375** and the fourth body channel **376**, and thus forms a single straight channel with the third body channel **375**.

The valve **37** can connect only the suction port connection pipe **36** to the suction channel connection pipe **34** through the fifth body channel **377**, which will be explained in detail later.

In the case in which the fifth body channel **577** is provided to connect only the suction port connection pipe **36** to the suction channel connection pipe **34**, air introduced into the support body through-hole **32** from the discharge port **21** of

the air pump through the discharge port connection pipe **35** should be discharged to the outside of the valve support body **31**.

Therefore, the valve support body **31** preferably further includes a communicating pipe **311** which communicates with the support body through-hole **32**, and a communicating groove **313** for discharging air discharged from the support body through-hole **32** through the communicating pipe **311** to the outside of the portable body **1** through a space between the valve support body **31** and the tank support part **15**.

In the case in which the discharge port connection pipe **35** and the supply channel connection pipe **33** are arranged at an angle of about 90 degrees with respect to each other, the communicating groove **313** is arranged opposite to the supply channel connection pipe **33** (arranged at an angle of about 180 degrees with respect to the supply channel connection pipe **33**).

The communicating groove **313** is concavely formed at a surface of the valve support body **31**, and is connected to the communicating pipe **311**.

The communicating groove **313** may include a first communicating groove **313***a* which extends from the communicating pipe **311** in parallel with the support body through-hole **32** and is cut in a height direction of the valve support body **31**, and a second communicating groove **313***b* which extends from the first communicating groove **313***a* perpendicularly to the support body through-hole **32** and is cut in a height direction of the valve support body **31**.

Hereinafter, a channel switching processes of the channel valve **3** will be described with reference to FIG. **4**. As shown in FIG. **4***a*, if the first body channel **373** and the second body channel **374** are respectively positioned at the discharge port connection pipe **35** and the supply channel connection pipe **33**, the third body channel **375** and the fourth body channel **376** are respectively positioned at the suction port connection pipe **36** and the suction channel connection pipe **34**, and the fifth body channel **377** is blocked by an inner peripheral surface of the support body through-hole **32**.

Therefore, air discharged from the discharge port of the air pump moves through the discharge port connection pipe **35**, the first body channel **373**, the second body channel **374** and the supply channel connection pipe **33**. External air is sucked into the suction port **23** of the air pump through the suction channel connection pipe **34**, the fourth body channel **376**, the third body channel **375** and the suction port connection pipe **36**.

If the body **37** is rotated (counterclockwise by an angle of about 90 degrees from the state of FIG. **4***a*) as shown in FIG. **4***b*, the second body channel **374** and the fourth body channel **376** are respectively positioned at the discharge port connection pipe **35** and the suction port connection pipe **36**.

In this case, the fifth body channel **377** is positioned at the suction channel connection pipe **34**. The first body channel **373** communicates with the communicating pipe **311**. The third body channel **375** is blocked by an inner peripheral surface of the support body through-hole **32**.

Accordingly, external air is sucked into the suction port **23** of the air pump through the suction channel connection pipe **34**, the fifth body channel **377**, the fourth body channel **376** and the suction port connection pipe **36**. Air discharged from the discharge port **21** of the air pump is discharged to the outside of the valve support body **31** through the discharge port connection pipe **35**, the second body channel **374**, the first body channel **373**, the communicating pipe **311** and the communicating groove **313**.

Different from the above description, if the channel valve **3** capable of connecting only the discharge port connection pipe **35** to the supply channel connection pipe **33** is embodied, the fifth body channel **377** is connected to a junction point of the first body channel **373** and the second body channel **374**, and the communicating pipe **311** is disposed opposite to the suction channel connection pipe **34**.

As shown in FIG. **2**, the suction tank **5** includes a suction tank body **52** which is removably coupled to the tank support part **15**, and a suction chamber **51** which is provided in the suction tank body **52** and provides a space for storing liquid. The suction chamber **51** communicates with the outside of the suction chamber **51** through a discharge port formed through the suction tank body **52**, and the discharge port is opened and closed by a discharge port opening/closing part **59**. Accordingly, a user can remove liquid from the suction chamber **51** through the discharge port opening/closing part **59** and the discharge port.

The suction chamber **51** is connected to the suction port **23** of the air pump **2** through the air suction channel C, and is also connected to a suction hole **613** (refer to FIG. **6**) of the nozzle part N through the suction channel **85**.

The air suction channel C penetrates a suction tank mounting pipe **55** and communicates with the suction chamber **51**. The suction tank mounting pipe **55** protrudes from a surface of the suction tank body **52** so as to be inserted into the suction channel connection pipe **34**.

The suction channel **85** protrudes by a certain distance from a bottom surface of the suction chamber **51** in a height direction of the suction chamber **51**, which prevents liquid stored in the suction chamber **51** from leaking to the outside of the suction chamber **51** through the suction channel **85**.

Accordingly, if air in the suction chamber **51** is sucked into the suction port **23** of the air pump through the air suction channel C, an internal air pressure of the suction chamber **51** is decreased so that liquid remaining in laundry moves to the suction chamber **51** through the suction hole **613** (refer to FIG. **5***b*) and the suction channel **85**.

The supply tank **4** includes a supply tank body **42** which is removably coupled to the tank support part **15**, a water tank which is provided in the supply tank body **42** to store water, and a detergent tank which is provided in the supply tank body **42** to store detergent. The supply tank body **42** is provided with a supply tank mounting pipe **477** which is inserted into the supply channel connection pipe **33** and communicates with the discharge port **21** of the air pump. The supply tank mounting pipe **477** protrudes from a surface of the supply tank body **42**.

As shown in FIG. **5**, the water tank **41** and the detergent tank **43** are separated from each other by a first partition wall **471** which is provided in a height direction of the supply tank body **42**.

The water tank **41** is divided into a water chamber **411** in which water is stored and a vibration part accommodation space **415** in which the vibration part V is accommodated. The water chamber (first chamber) **411** and the vibration part accommodation space **415** are separated from each other by an accommodation partition wall **4151** which is fixed to the supply tank body **42**.

The water chamber **411** communicates with the outside through a water supply port **413** formed through the supply tank body **42**. The water supply port **413** is opened and closed by a supply port opening/closing part **45**. Therefore, a user can supply water to the water chamber **411** through the supply port opening/closing part **45**.

The detergent tank **43** is provided with a detergent chamber **431** thereinside, in which detergent is stored. The

detergent chamber **431** is fixed to the first partition wall **471**, and is defined by a second partition wall **473** and a third partition wall **475** which are provided in a longitudinal direction of the supply tank body **42** (perpendicularly to the first partition wall). The third partition wall **475** forming a top surface of the detergent chamber **431** is provided with a detergent supply port **433** which is opened and closed by a supply port opening/closing part **45**. Accordingly, a user can supply detergent to the detergent chamber **431** through the supply port opening/closing part **45**.

Discharge channels **81** and **83**, which supply liquid stored in the water chamber **411** and the detergent chamber **431** to the nozzle part N, are provided under the second partition wall **473** forming a bottom surface of the detergent chamber **431**.

As shown in FIG. **6**, the discharge channels **81** and include a water channel **81** for connecting the water chamber **411** to the nozzle part N and a detergent channel for connecting the detergent chamber **431** to the nozzle part N. The detergent channel is configured as a detergent discharge hole **83** which is formed through the second partition wall **473**.

The water channel **81** includes a water discharge pipe **813** for discharging water in the water chamber **411** to a space under the second partition wall **473** and a valve accommodation pipe **811** for connecting the water discharge pipe **813** and the detergent discharge hole **83**.

The valve accommodation pipe **811** extends from the detergent discharge hole **83** toward the nozzle part N, and the tank valve **9** is positioned in the valve accommodating pipe **811**.

The tank valve **9** may include a valve body **91** inserted into the valve accommodation pipe **811** through the detergent discharge hole **83**, channel switching parts **93**, **95** and **97** provided at an outer peripheral surface of the valve body **91** to allow any one of the detergent channel and the water channel **81** to communicate with a connection channel **635**, and a valve channel **99** provided in a longitudinal direction of the valve body **91** to guide water supplied to the valve accommodation pipe **811** to the channel switching parts.

The valve body **91** is inserted into the valve accommodation pipe **811** through a partition wall through-hole **4751** formed at the third partition wall **475** and the detergent discharge hole **83**. Preferably, a top surface of the valve body **91** is exposed through the top surface of the supply tank body **42** (surface provided with the supply port opening/closing part **45**), which allows a user to change positions of the channel switching parts **93**, **95** and **97** by manipulating the valve body **91**.

A length of the valve body **91** or the valve accommodation pipe **811** and a position of the water discharge pipe **813** may be set to satisfy the following conditions: if a user moves the valve body **91** toward the bottom surface of the valve accommodation pipe **811**, the water discharge pipe **813** is closed by the valve body **91**, and if a user moves the valve body **91** away from the bottom surface of the valve accommodation pipe **811**, the water discharge pipe **813** is opened.

The channel switching parts include a first recess **93** and a second recess **95** which are concavely formed at a surface of the valve body **91**. An opening/closing part **97**, which is configured to contact the detergent discharge hole **83**, is provided between the first recess **93** and the second recess **95**. In this case, if the water discharge pipe **813** is opened by the valve body **91**, the opening/closing part **97** is positioned above the connection channel **635**. If the water discharge pipe **813** is closed by the valve body **91**, the opening/closing part **97** is positioned below the connection channel **635**. The valve channel **99** connects a bottom surface of the valve body **91** and the second recess **95**.

The nozzle part N is provided at an outer peripheral surface of the supply tank body **42**. The nozzle part N includes a nozzle body **61** fixed to the supply tank body **42** and a spray body **63** provided in the nozzle body **61** to discharge detergent or water to the outside of the nozzle body **61**.

The nozzle body **61** is provided with a suction hole (suction nozzle) **613** which is connected to the suction channel **85** provided at the suction tank **5**. The suction hole **613** is formed through a chamber support pipe **611** which penetrates the nozzle body **61** and is connected to the suction channel **85**. In this case, an end portion of the chamber support pipe **611** protrudes from a surface of the nozzle body **61**, and a nozzle connection part **57** to which the chamber support pipe **611** is removably coupled is provided at a bottom surface of the suction tank body **52**.

The nozzle body **61** is further provided with a discharge part **615** which is formed through the nozzle body **61** and is connected to the spray body **63**.

The suction hole **613** may be configured with a single hole which is formed through the nozzle body **61**, or may be configured with a plurality of holes which are formed through the nozzle body **61** to be connected to the suction channel **85** and are arranged around an outer peripheral surface of the discharge part **615**.

The spray body (supply nozzle) **63** is fixed to the nozzle body **61** and is positioned on the discharge part **615**. The spray body **63** may include a storage part **633** connected to the detergent discharge hole **83** through the connection channel **635**, a chamber **637** connected to the air supply channel S communicating with the discharge port **21** of the air pump, and a chamber connection pipe **639** for connecting the chamber **637** to the storage part **633** and the discharge part **615**.

The chamber **637** serves as a space into which air is introduced through the air supply channel S. The air supply channel S penetrates the first partition wall **471** or the second partition wall **473** so as to connect the chamber **637** and the supply tank mounting pipe **477** (refer to FIG. **5**). The chamber **637** may be formed in a ring shape which surrounds an outer peripheral surface of the storage part **633**. In this case, the chamber connection pipe **639** may be provided in plural numbers. By virtue of such a structure, even though air is supplied through a portion of the chamber **637** via the air supply channel S, air discharged to the outside of the nozzle body **61** through the discharge part **615** is prevented from flowing in a biased direction.

Preferably, a cross-sectional area of the junction part **6391** is smaller than a cross-sectional area of channels disposed upstream and downstream of the junction part **6391**, which allows liquid stored in the storage part **633** to move more easily to the discharge part **615** by a venturi effect.

A water or detergent spraying process of the portable laundry treating apparatus **100** structured as above will now be described. As shown in FIG. **6***a*, if the water discharge pipe **813** is opened by the valve body **91**, the opening/closing part **97** is positioned above the connection channel **635**. Therefore, connection between the detergent chamber **431** and the nozzle part N is blocked, and the water chamber **411** is connected to the nozzle part N. In other words, water stored in the water chamber **411** can move to the storage part **633** through the water discharge pipe **813**, the valve accommodation pipe **811**, the valve channel **99** and the connection channel **635**.

Air discharged from the discharge port **21** of the air pump **2** moves to the discharge part **615** via the discharge port connection pipe **35**, the supply channel connection pipe **33**, the supply tank mounting pipe **477**, the air supply channel S, the chamber **637**, the chamber connection pipe **639** and the junction part **6391**. If air is discharged through the discharge part **615**, an internal pressure of the discharge part **615** is decreased, and thus water stored in the storage part **633** is sprayed from the discharge part **615** through the junction part **6391**. Accordingly, the portable laundry treating apparatus **100** of the present invention can supply water only to a local area of a surface of laundry.

As shown in FIG. **6***b*, if a user presses the valve body **91** toward the bottom surface of the valve accommodation pipe **811**, the valve body **91** closes the water discharge pipe **813**, and the opening/closing part **97** moves below the connection channel **635**. Therefore, connection between the water chamber **411** and the nozzle part N is blocked, and the detergent chamber **431** is connected to the nozzle part N. Detergent stored in the detergent chamber **431** moves to the storage part **633** through the detergent discharge hole **83** and the connection channel **635**. Detergent stored in the storage part **633** moves to the discharge part **615** when air is discharged from the discharge part **615**, and is sprayed only to a local area of a surface of laundry.

The portable laundry treating apparatus **100** structured as above may further include a vibration part V for vibrating the nozzle part N so that absorption of water or detergent discharged from the discharge part **615** to laundry can be promoted and dirt separated from laundry by detergent or water can be easily sucked by the nozzle part N. One exemplary position of the vibration part V is illustrated in FIG. **5**, however, the vibration part V may be disposed at other various positions at which the vibration part V can vibrate the nozzle part N.

The vibration part V is disposed in a vibration part accommodation space **415** provided at the supply tank **4**. The vibration part V may include a vibration motor M, a battery B and a switch SW for connecting the vibration motor M to the battery B. The switch SW may include a contact part SW**1** which is positioned at a bottom surface of the nozzle body **61** (or may protrude from a bottom surface of the nozzle body), and a motor control part SW**2** for supplying power to the vibration motor M by connecting the vibration motor M to the battery B when the contact part SW**1** is pressed.

Accordingly, only if a user touches the nozzle body **61** to a surface of laundry will the nozzle part N be vibrated by the vibration part V. As a result, the portable laundry treating apparatus **100** of the present invention can more easily remove local contamination of laundry.

The portable laundry treating apparatus **100** structured as above may be operated in three modes (a suction mode, a detergent supply and suction mode and a water supply and suction mode).

The suction mode is the operational mode of the portable laundry treating apparatus **100** depicted in FIG. **4***b*, the detergent supply and suction mode is the operational mode of the portable laundry treating apparatus **100** depicted in FIGS. **4***a* and **6***b*, and the water supply and suction mode is the operational mode of the portable laundry treating apparatus **100** depicted in FIGS. **4***a* and **6***a*.

Different from FIG. **4**, if the channel valve **3** is provided to connect only the discharge port connection pipe **35** to the supply channel connection pipe **33** (the fifth body channel **377** is connected to a junction part of the first body channel **373** and the second body channel **374**, and the communicating pipe **311** is provided opposite to the suction channel connection pipe **34**), the portable laundry treating apparatus **100** of the present invention may be operated in four modes (a detergent supply mode, a water supply mode, a detergent supply and suction mode and a water supply and suction mode).

FIGS. **7** through **12** are views illustrating an example of the portable laundry treating apparatus **200** depicted in FIG. **1***b*. The portable laundry treating apparatus **200** according to this embodiment comprises a portable body **1** which can be carried by hand, liquid storage parts **4** and **5** including a water chamber, a detergent chamber and a suction chamber, a nozzle part N communicating with the respective chambers of the liquid storage parts **4** and **5**, and a liquid transferring part which supplies liquid stored in the water chamber and the detergent chamber to the nozzle part N and transfers liquid remaining in laundry to the suction chamber through the nozzle part N.

The portable body **1** includes a handle **11** which a user can grab to carry the portable laundry treating apparatus **200** of the present invention, and a switch **13** for controlling operation of the liquid transferring part, more particularly, controlling operation of an air pump provided at the liquid transferring part.

As shown in FIG. **8**, the liquid storage parts **4** and **5** include a tank body **42** for forming an external appearance, a plurality of partition walls **421**, **423** and **425** which are provided in the tank body **42** to separate a water chamber **44**, a detergent chamber **46** and a suction chamber **48** from each other, and a chamber opening/closing part **49** which is removably coupled to the tank body **42** to open and close the respective chambers **44**, **46** and **48**.

The first partition wall **421**, the second partition wall **423** and the third partition wall **425** divide an internal space of the tank body **42** into three spaces. The first partition wall **421** may extend from a bottom surface of the tank body **42** in a height direction of the tank body **42**, and the second partition wall **423** and the third partition wall **425** may extend from the first partition wall **421** to upper corners of the tank body **42**, such that the three partition walls may be arranged in a Y shape in the tank body.

In this case, the water chamber **44** is defined by the first partition wall **421**, the second partition wall **423** and an inner peripheral surface of the tank body **42**. The detergent chamber **46** is defined by the second partition wall **423**, the third partition wall **425** and an inner peripheral surface of the tank body **42**. The suction chamber **48** is defined by the third partition wall **425**, the first partition wall **421** and an inner peripheral surface of the tank body **42**.

The three chambers **44**, **46** and **48** may have the same volume. However, since the use of detergent is generally less than the use of water, the detergent chamber **46** may be formed to have a smaller volume than the water chamber **44** or the suction chamber **48**.

A first air supply channel S**1** connected to the nozzle part N is provided in the water chamber **44**. A second air supply channel S**2** for supplying air into the detergent chamber **46** is provided in the detergent chamber **46**. An air suction channel C for discharging air from the suction chamber **48** is provided in the suction chamber **48**.

The chamber opening/closing part **49** enables a user to supply water or detergent to the water chamber **44** or the detergent chamber **46** and also to discharge liquid from the suction chamber **48**. The chamber opening/closing part **49** includes an opening/closing body **491**, and a partition wall accommodation recess **498** which is formed at a surface of

the opening/closing body **491** to accommodate the partition walls **421**, **423** and **425** therein.

As shown in FIG. **7**, a front surface of the opening/closing body **491** (a surface of the opening/closing body **491**, at which the partition wall accommodation recess **498** is formed) is formed with a first channel insertion hole **495** into which the first air supply channel S**1** is inserted, a second channel insertion hole **496** into which the second air supply channel S**2** is inserted and a third channel insertion hole **497** into which the air suction channel C is inserted.

As shown in FIG. **8**, a rear surface of the opening/closing body **491** (a surface of the opening/closing body **491**, at which the partition wall accommodation recess **498** is not formed) is formed with a first pipe accommodation hole **492** communicating with the first channel insertion hole **495**, a second pipe accommodation hole **493** communicating with the second channel insertion hole **496**, and a third pipe accommodation hole **494** communicating with the third channel insertion hole **497**.

Preferably, the tank body **42** structured as above is removably coupled to the portable body **1**. For this, the portable body **1** may be further provided with a tank support part **15** in which an outer peripheral surface of the tank body **42** is removably accommodated.

As shown in FIG. **9**, the tank support part **15** may include a flange **152** which is provided at the portable body **1** and in which the outer peripheral surface of the tank body **42** is fitted, and a support body **151** for supporting the tank body **42** coupled to the flange **152**.

The support body **151** is provided with a first pipe **153** inserted into the first pipe accommodation hole **492** of the chamber opening/closing part **49**, a second pipe **154** inserted into the second pipe accommodation hole **493**, and a third pipe **155** inserted into the third pipe accommodation hole **494**.

The first pipe **153**, the second pipe **154** and the third pipe **155** are provided at a front surface **15***f* of the tank support part **15** and are exposed to the outside of the portable body **1**. A rear surface **15***r* of the tank support part **15** is formed with a first hole **156** connected to the first pipe **153**, a second hole **157** connected to the second pipe **154**, and a third hole **158** connected to the third pipe **155**.

When viewed from the rear of the tank support part **15**, the first hole **156**, the second hole **157** and the third hole **158** are sequentially arranged clockwise on the rear surface **15***r* of the tank support part **15**. However, when viewed from the front of the tank support part **15**, the third hole **158**, the second hole **157** and the first hole **156** are sequentially arranged clockwise on the rear surface **15***r* of the tank support part **15**.

The rear surface **15***r* of the tank support part **15** is further provided with a rotating shaft accommodation recess **159** in which a rotating shaft **392** of the channel valve (which will be described later) is accommodated.

In this case, the first hole **156** and the second hole **157** are arranged apart from each other by a certain interval therebetween along a circumference R of a circle, the center of which is the rotating shaft accommodation recess **159** (positioned at the same distance from the rotating shaft accommodation recess **159** and arranged apart from each other by a certain interval), and the third hole **158** is not positioned on the circumference R of the circle, on which the first hole **156** and the second hole **157** are positioned. For example, the third hole **158** is positioned on a circumference of another circle which has a different diameter from the circle on the circumference R of which the first hole **156** and the second hole **157** are positioned.

FIG. **9** illustrates one example in which the third hole **158** is positioned at an inner area of the circumference R of the circle. Alternatively, the third hole **158** may be positioned at an outer area of the circumference R of the circle. For convenience of explanation, this embodiment will now be described based on arrangement of the first hole, the second hole and the third hole depicted in FIG. **9**.

The liquid transferring part may include an air pump **2**, a first air supply channel S**1** for connecting the air pump **2** to the nozzle part N, a second air supply channel S**2** and an air suction channel C for respectively connecting the air pump **2** to the detergent chamber and the suction chamber, and channels **81**, **83** and **85** (refer to FIGS. **10** through **12**) by which the respective chambers of the liquid storage part communicate with the nozzle part N.

The air pump **2** is fixedly provided in the portable body **1**, and includes a discharge port **21** through which air is discharged from the air pump **2** and a suction port **23** through which air is sucked into the air pump **2**.

A channel valve **3** for controlling opening/closing of the first hole **156**, the second hole **157** and the third hole **158** is provided between the air pump **2** and the rear surface **15***r* of the tank support part **15**. The channel valve **3** may include a pump connection part **38** to which the discharge port **21** and the suction port **23** of the air pump **2** are coupled, and a valve **39** which is rotatably provided between the pump connection part **38** and the tank support part **15**.

The valve **39** includes a valve body **391** rotatably provided in the portable body **1**, a rotating shaft **392** provided at the valve body **391** and inserted into the rotating shaft accommodation recess **159**, a through-hole **393** and a slot **394** formed through the valve body **391**, and an external air channel opening/closing part **395** provided at the valve body **391** and extending toward the pump connection part **38**.

The valve body **391** is provided with a valve handle **3911** which is exposed to the outside of the portable body **1**. The valve handle **3911** is positioned in a valve accommodation slot **17** (refer to FIG. **7**) which is formed along an outer peripheral surface of the portable body **1**.

The through-hole **393** serves to open and close any one of the first hole **156** and the second hole **157** according to a rotation angle of the valve body **391**. Accordingly, the first hole **156** and the second hole **157** are formed at the rear surface **15***r* of the tank support part **15** and are disposed on the circumference R of the circle, the radius of which is a distance between the rotating shaft **392** and the through-hole **393**.

The slot **394** serves to open and close the third hole **158** according to a rotation angle of the valve body **391**. The slot **394** may be formed in an arc shape. In detail, the slot **394** may have an arc shape which extends from a point apart from the through-hole **393** by about 180 degrees toward the through-hole **393** in a rotating direction of the valve body **391**. In this case, the slot **394** of an arc shape may have a length and a position capable of opening the third hole **158** both when the first hole **156** is opened (water is sprayed) and when both the first hole **156** and the second hole **157** are closed (water and detergent are not sprayed).

The external air channel opening/closing part **395** is configured to close an external air channel only when the first hole **156** and the third hole **158** are opened at the same time by the through-hole **393** and the slot **394**.

The pump connection part **38** is configured to supply air from the air pump **2** to the valve **39** and transfer air introduced into the valve **39** through the third hole **158** to the suction port **23** of the air pump **2**.

The pump connection part **38** includes a connection body **387** which is coupled to the air pump **2**, a discharge port accommodation hole **381** which is formed through the connection body **387** and into which the discharge port **21** of the air pump is inserted, and a suction port accommodation hole **382** which is formed through the connection body **387** and into which the suction port **23** of the air pump **2** is inserted.

The discharge port **21** of the air pump **2** may be located at the same position as a rotation center (rotating shaft **392**) of the valve **39**.

A surface of the connection body **387** (front surface of the connection body) contacting the valve **39** may be provided with a first connection channel **384** which extends from the discharge port accommodation hole **381** to a point corresponding to the second hole **157**, a second connection channel **385** which extends from a point corresponding to the third hole **158** in a direction away from the discharge port accommodation hole **381**, a main channel **383** which connects the first connection channel **384** and the second connection channel **385** and at which the suction port accommodation hole **382** is positioned, and an external air channel **386** by which the main channel **383** communicates with the outside of the portable body **1** and which is opened and closed by the external air channel opening/closing past **395**.

The main channel **383** may be formed in an arc shape that has the same radius of curvature as the radius of the circumference R of the circle on which the first hole **156** and the second hole **157** are positioned. In this case, the first connection channel **384** has the same length as the radius of the circumference R of the circle on which the first hole **156** and the second hole **157** are positioned, and the second connection channel **385** has a smaller length than the radius of the circumference R of the circle.

The first connection channel **384** and the second connection channel **385** are arranged perpendicularly to each other, and the suction port accommodation hole **382** is disposed at a point at which an extension line of the first connection channel **384** intersects with the main channel **383**.

The external air channel **386**, by which the main channel **383** communicates with the outside of the portable body **1**, is positioned between the suction port accommodation hole **382** and a point corresponding to the first hole **156**. An outer peripheral surface of the portable body **1** is formed with an external air channel communicating hole (not shown) through which the external air channel **386** communicates with the outside of the portable body **1**.

Since the main channel **383**, the first connection channel **384**, the second connection channel **385** and the external air channel **386** should be sealed by the surface of the valve body **391**, the channels **383**, **384**, **385** and **386** are concavely formed at the surface of the connection body **387**.

The channel valve **3** may further include a sealing part **396** for sealing a gap between the valve body **391** and the rear surface **15***r* of the tank support part **15**. The sealing part **396** has a similar structure to the rear surface **15***r* of the tank support part **15**. In detail, the sealing part **396** includes a sealing body **3965**, a first sealing hole **3961** communicating with the first hole **156**, a second sealing hole **3962** communicating with the second hole **157**, a third sealing hole **3963** communicating with the third hole **158**, and a rotating shaft through-hole **3964** communicating with the rotating shaft accommodation hole **159**. The first, second and third sealing holes **3961**, **3962** and **3963** and the rotating shaft through-hole **3964** are formed through the sealing body **3965**.

Hereinafter, operation of the above-described channel valve **3** will be described with reference to FIG. **10**. An initial position of the valve **39** may be diversely set. For example, an initial position of the valve **39** may be set to a position in which the through-hole **393** and the slot **394** do not open any one of the sealing holes **3961**, **3962** and **3963**, or may be set to any one of positions depicted in FIGS. **10***a* through **10***c*. Hereinafter, description will be made based on the case in which the initial position of the valve **39** is set as illustrated in FIG. **10***a* for convenience of explanation.

When the valve **39** is located at the initial position, the valve **39** opens the second sealing hole **3962** and the second hole **157** formed at the tank support part **15**.

In such a state, if power is applied to the air pump **2** through the switch **13**, air discharged from the discharge port **21** of the air pump **2** is introduced into the main channel **383** through the discharge port accommodation hole **381** and the first connection channel **384**. Because air introduced into the main channel **383** cannot move to the external air channel **386** by the external air channel opening/closing part **395**, air introduced into the main channel **383** is discharged to the second sealing hole **3962** and the second hole **157**.

The second hole **157** is connected to the second pipe **154** provided at the front surface **15***f* of the tank support part **15**, and the second pipe **154** is connected to the second air supply channel S**2** through the second pipe accommodation hole **493** and the second channel insertion hole **496** of the chamber opening/closing part **49**. Therefore, air discharged from the discharge port **21** of the air pump **2** is supplied into the detergent chamber **46** through the second air supply channel S**2** and increases an internal pressure of the detergent chamber **46**.

If power is applied to the air pump **2**, external air of the portable body **1** moves to the suction port **23** of the air pump **2** through the external air channel **386**, the main channel **383** and the suction port accommodation hole **382**.

If a user rotates the valve handle **3911** clockwise by a certain angle as shown in FIG. **10***b*, the through-hole **393** moves toward the first sealing hole **3961**, the slot **394** moves toward the third sealing hole **3963**, and the external air channel opening/closing part **395** moves toward the external air channel **386**. Accordingly, the first sealing hole **3961** and the third sealing hole **3963** are opened, and the external air channel **386** is closed.

In this case, air discharged from the discharge port **21** of the air pump **2** is supplied to the discharge port accommodation hole **381**, the first connection channel **384** and the main channel **383**. Air supplied to the main channel **393** is supplied to the first sealing hole **3961** through the through-hole **393**.

The first sealing hole **3961** is connected to the first hole **156** formed at the rear surface **15***r* of the tank support part **15**. The first hole **156** is connected to the first air supply channel S**1** through the first pipe **153**, the first pipe accommodation hole **492** and the first channel insertion hole **495**. Accordingly, air discharged from the discharge port **21** of the air pump **2** moves to the nozzle part N through the first air supply channel S**1**.

The slot **394** allows the third sealing hole **3963** to communicate with the second connection channel **385**. The third sealing hole **3963** is connected to the suction chamber **48** through the third hole **158**, the third pipe **155**, the third pipe accommodation hole **494**, the third channel insertion hole **497** and the air suction channel C.

Accordingly, if power is applied to the air pump **2**, air in the suction chamber **48** moves to the suction port **23** of the air pump **2** through the air suction channel C, the third

channel insertion hole **497**, the third pipe accommodation hole **494**, the third pipe **155**, the third hole **158**, the third sealing hole **3963**, the slot **394**, the second connection channel **385**, the main channel **383** and the suction port accommodation hole **382**.

If a user further rotates the valve handle **3911** clockwise by a certain angle from the state of FIG. **10***b*, the valve **39** becomes a state of FIG. **10***c*. In this case, the through-hole **393** is positioned at a point corresponding to the first sealing hole **3961** and the external air channel **386**, the slot **394** moves toward the second sealing hole **3962**, and the external air channel opening/closing part **395** moves toward the suction port accommodation hole **382**.

Therefore, the second sealing hole **3962** and the first sealing hole **3961** are closed by the valve body **391**, and the external air channel **386** is opened. Since the slot **394** has an arc shape which is long enough to open the third sealing hole **3963** even when both the second sealing hole **3962** and the first sealing hole **3961** are closed, the third sealing hole **3963** is kept opened by the slot **394**. In this case, air discharged from the discharge port **21** of the air pump **2** is discharged to the outside of the portable body **1** through the first connection channel **384**, the main channel **383** and the external air channel **386**.

Air in the suction chamber **48** is sucked into the suction port **23** of the air pump **2**. Since such a suction process is the same as described above with reference to FIG. **10***b*, detailed explanation thereof will be omitted.

Hereinafter, a process of spraying water or detergent stored in the water chamber **44** and the detergent chamber **46** through the nozzle part N and a process of transferring liquid remaining in laundry to the suction chamber **48** will be described.

FIG. **11** is a view illustrating the nozzle part N of the portable laundry treating apparatus according to this embodiment of the present invention. The nozzle part N may include a second nozzle body **64** which is fixed to the tank body **42** to communicate with the respective chambers **44**, **46** and **48**, and a first nozzle body **62** which is fixed to the second nozzle body **64** and has a contact surface configured to contact laundry.

The first nozzle body **62** is provided with a water discharge hole **623**, a detergent discharge hole **625** and a suction part **627**. The water discharge hole **623** and the detergent discharge hole **625** are formed through the first nozzle body **62**. Liquid discharged from the water chamber **44** and the detergent chamber **46** through the second nozzle body **64** is supplied to laundry through the water discharge hole **623** and the detergent discharge hole **625**.

The suction part **627** may include at least two suction holes **6271** which are formed through the first nozzle body **62** and a hole connection recess **6273** for connecting the suction holes **6271** to each other. The connection recess **6273** may be concavely formed at a surface of the first nozzle body **62** which is configured to contact laundry.

The water discharge hole **623** and the detergent discharge hole **625** may be provided in plural numbers at the first nozzle body **62**. FIG. **11** illustrates an exemplary structure including four water discharge holes **623** and one detergent discharge hole **625**. The water discharge hole **623** may communicate with the connection recess **6273**. By this structure, when liquid moves to the suction chamber **48** through the suction part **627**, the water discharge hole **623** can also perform the function of the connection recess **6273** (which will be described in detail later).

The second nozzle body **64** includes a fixing part **649** provided at the tank body **42** to support the first nozzle body **62**, a water discharge pipe **645** extending from the fixing part **649** toward the water chamber **44**, a detergent discharge pipe **643** extending from the fixing part **649** toward the detergent chamber **46**, and a suction pipe **647** extending from the fixing part **649** toward the suction chamber **48**.

The water discharge pipe **645** is formed through the fixing part **649** and is connected to the water discharge hole **623**. In the case in which the water discharge hole **623** is provided in plural numbers, it is preferable that the water discharge pipe **645** communicates with a discharge hole connection channel **6451** which connects the plural water discharge holes **623** to each other. In this case, the discharge hole connection channel **6451** is provided at a surface of the second nozzle body **64** which contacts the first nozzle body **62**, and the water discharge pipe **645** penetrates the fixing part **649** and is connected to the discharge hole connection channel **6451**.

The detergent discharge pipe **643** is formed through the fixing part **649** and is connected to the detergent discharge hole **625**. In the case in which the detergent discharge hole **625** is provided in plural numbers, the detergent discharge pipe **643** may have the same structure as the water discharge pipe **645**.

The suction pipe **647** is also formed through the fixing part **649** and is connected to the suction part **627**. In the case in which the suction part is configured with plural suction holes **6271**, it is preferable that the suction pipe **647** communicates with a suction hole connection channel **6471** by which the respective suction holes **6271** communicate with each other. The suction hole connection channel **6471** is concavely formed at a surface of the second nozzle body **64** which contacts the first nozzle body **62**, and the suction pipe **647** penetrates the fixing part **649** and is connected to the suction hole connection channel **6471**.

The first nozzle body **62** may be configured to be vibrated by the vibration part (not shown). In this case, the vibration part is fixedly provided in the tank body **42**, and the first nozzle body **62** is fixed to the vibration part. The vibration part serves to vibrate the second nozzle body through the first nozzle body **62**, thereby enhancing washing performance. The vibration part may be configured to vibrate the nozzle part N when the portable laundry treating apparatus **200** contacts laundry. In other words, the nozzle part N may function as a switch of the vibration part.

The second nozzle body **64** has a body through-hole **621** which is formed through the second nozzle body **64**, and the first nozzle body **62** is further provided with a protruding part **641** which is inserted into the body through-hole **621** and protrudes to the outside of the first nozzle body **62**. In this case, the protruding part **641** protrudes from the fixing part **649**, and the vibration part may be configured to operate when external force is applied to the protruding part **641**.

As shown in FIG. **12***a*, the water discharge pipe **645** provided at the nozzle part N is connected to the first channel insertion hole **495** of the chamber opening/closing part **49** through the first air supply channel S**1**, and the water chamber **44** is connected to the first air supply channel S**1** through the water channel **81**.

The water channel **81** includes a first water discharge channel **815** which is provided in a longitudinal direction of the water chamber **44** and by which the first air supply channel S**1** and the water chamber **44** communicate with each other, and a second water discharge channel **817** which is provided in a height direction of the water chamber **44** to allow the water chamber **44** to communicate with the first air supply channel S**1**.

The first water discharge channel **815** is configured with a pipe which extends from a connection point with the first air supply channel S**1** toward the inside of the water chamber **44**, and the second water discharge channel **817** communicates with the first air supply channel S**1** through a first discharge hole **8171** and a second discharge hole **8173** which are formed through the water chamber **44**.

In this case, the first discharge hole **8171** is positioned at a lower portion (e.g., lowermost end portion) of the water chamber **44**, the second discharge hole **8173** is positioned above the first discharge hole **8171**, and the first water discharge channel **815** is positioned above the second discharge hole **8173** (e.g., uppermost end portion of the water chamber). The water channel **81** structured as above allows water in the water chamber **44** to be discharged therefrom regardless of a degree of inclination of the portable laundry treating apparatus **200**.

The nozzle part N may be inclined downward or upward according to the use of the portable laundry treating apparatus **200**. When the portable laundry treating apparatus **200** is in a horizontal state or the nozzle part N is inclined downward, the second water discharge channel **817** allows the water chamber **44** to communicate with the first air supply channel S**1**. When the nozzle part N is inclined upward, the first water discharge channel **815** allows the water chamber **44** to communicate with the first air supply channel S**1**.

Accordingly, if air is supplied to the first air supply channel S**1** through the channel valve **3** (refer to FIG. **10***b*), an internal pressure of the first air supply channel S**1** is decreased and thus, water in the water chamber **44** moves to the first air supply channel S**1** through the water channel **81**. Water in the first air supply channel S**1** moves to the discharge hole connection channel **6451** through the water discharge pipe **645**, and water in the discharge hole connection channel **6451** is sprayed onto a contaminated area of laundry through the water discharge hole **623**.

As shown in FIG. **12***b*, the detergent discharge pipe **643** provided at the nozzle part N is connected to the detergent chamber **46** through the detergent channel **83** provided at the tank body **42**, and the detergent chamber **46** is connected to the discharge port **21** of the air pump **2** through the second air supply channel S**2**. The second air supply channel S**2** includes a first pipe S**21** connected to the second channel insertion hole **496** of the chamber opening/closing part **49**, and a second pipe S**23** configured to surround an outer peripheral surface of the first pipe S**21** and supply air discharged from the first pipe S**21** to the detergent chamber **46**.

The first pipe S**21** extends from the second channel insertion hole **496** toward a front surface of the detergent chamber **46** at which the nozzle part N is positioned. The second pipe S**23** extends from a surface of the detergent chamber **46** toward the second channel insertion hole **496** so as to accommodate an outer peripheral surface of the first pipe S**21** therein. However, the second pipe S**23** is not in contact with a rear surface of the detergent chamber **46** (surface at which the chamber opening/closing part **49** is provided). The second air supply channel S**2** having a dual pipe structure allows detergent stored in the detergent chamber to move toward the detergent channel **83** regardless of a position of the portable laundry treating apparatus **200**.

Accordingly, if air is supplied to the first pipe S**21** through the channel valve **3** (refer to FIG. **10***a*), air moves to the rear of the detergent chamber **46** (directed to the chamber opening/closing part **49**) through the second pipe S**23**. If air is supplied to the rear of the detergent chamber **46**, detergent is supplied to the detergent discharge pipe **643** of the nozzle part N through the detergent channel **83** provided at the front of the detergent chamber **46**, and air in the detergent discharge pipe **643** is sprayed onto a contaminated area of laundry through the detergent discharge hole **625**.

As shown in FIG. **12***c*, the suction pipe **647** provided at the nozzle part N is connected to the suction chamber **48** through the suction channel **85**, and the suction chamber **48** is connected to the suction port **23** of the air pump **2** through the air suction channel C. The air suction channel C includes a first suction channel C**1** inserted into the third channel insertion hole **497** of the chamber opening/closing part **49**, and a second suction channel C**2** configured to surround an outer peripheral surface of the first suction channel C**1** and guide air in the suction chamber **48** to the first suction channel C**1**.

The first suction channel C**1** is configured with a pipe which extends from the third channel insertion hole **497** toward a front surface of the suction chamber **48** at which the nozzle part N is positioned. The second suction channel C**2** extends from a front surface of the suction chamber **48** toward the third channel insertion hole **497** so as to accommodate an outer peripheral surface of the first suction channel C**1** therein. However, the pipe is not in contact with a rear surface of the suction chamber **48**.

The air suction channel C having a dual pipe structure prevents liquid in the suction chamber **48** from moving to the suction port **23** of the air pump **2** regardless of inclination of the portable laundry treating apparatus **200**.

If air in the first suction channel C**1** moves to the suction port **23** of the air pump **2** through the channel valve **3** (refer to FIGS. **10***b* and **10***c*), air in the suction chamber **48** moves to the second suction channel C**2** and accordingly, an internal air pressure of the suction chamber **48** is decreased. If an internal air pressure of the suction chamber **48** is decreased, liquid remaining in a contaminated area of laundry moves to the suction chamber **48** through the suction holes **6271**, the suction hole connection channel **6471**, the suction pipe **647** and the suction channel **85**.

Since the plural suction holes **6271** formed at the first nozzle body **62** are connected to each other through the connection recess **6273**, a negative pressure is generated at the connection recess **6273** as well as the suction holes **6271**.

The water discharge hole **623** formed at the first nozzle body **62** communicates with the connection recess **6273**. Accordingly, liquid remaining in laundry can be removed rapidly through the suction holes **6271**, the connection recess **6273** and the water discharge hole **623**.

It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the inventions. Thus, it is intended that the present invention covers the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

What is claimed is:

1. A hand-held laundry treating apparatus comprising:

a portable body;

a supply tank including a tank body provided at the portable body, a water chamber provided in the tank body to store water therein, and a detergent chamber provided in the tank body to store detergent therein;

a suction tank including a suction chamber provided at the portable body to store liquid therein; and

a liquid transferring part configured to supply liquid stored in the supply tank to laundry and transfer liquid remaining in laundry to the suction tank;

a supply nozzle communicating with the water chamber and the detergent chamber to guide liquid discharged from the supply tank to laundry; and

a suction nozzle communicating with the suction tank to suck liquid remaining in laundry to the suction tank,

wherein the liquid transferring part includes:

an air pump provided at the portable body and including a discharge port through which air is discharged and a suction port through which air is sucked;

an air supply channel configured to connect the discharge port and the supply nozzle;

an air suction channel configured to connect the suction port and the suction tank;

a discharge channel configured to connect the water chamber and the detergent chamber to the supply nozzle; and

a suction channel configured to connect the suction chamber to the suction nozzle,

wherein the supply nozzle includes:

a nozzle body fixed to the supply tank and including a discharge part which communicates with an outside;

a spray body provided at the nozzle body;

a storage part provided in the spray body, into which liquid in the water chamber and the detergent chamber is introduced through the discharge channel;

a chamber provided at the spray body, to which the air supply channel is connected; and

a chamber connection pipe configured to transfer liquid in the storage part to the discharge part by connecting the chamber, the discharge part and the storage part to each other and transferring air introduced into the chamber to the discharge part, and

wherein the chamber connection pipe further includes a junction part having a cross-sectional area which is gradually decreased, and the discharge part and the storage part are connected to the chamber connection pipe through the junction part.

2. The hand-held laundry treating apparatus according to claim **1**, wherein the suction nozzle includes a suction hole which is formed through the nozzle body and to which the suction channel is connected.

3. The hand-held laundry treating apparatus according to claim **1**, further comprising:

a vibration part configured to vibrate at least any one of the supply nozzle and the suction nozzle.

4. The hand-held laundry treating apparatus according to claim **1**, wherein the liquid transferring part is configured to simultaneously supply liquid stored in the supply tank to laundry and transfer liquid remaining in laundry to the suction tank.

5. The hand-held laundry treating apparatus according to claim **1**, wherein the portable body further comprises:

a handle configured to be grasped by a hand of a user, the handle being connected to a liquid storage part; and

a nozzle configured to contact laundry, the nozzle being connected to the liquid storage part,

wherein the handle, the liquid storage part, and the nozzle are fixed with respect to one another so that movement of the handle in horizontal and vertical directions toward dirt on laundry creates a corresponding movement of the liquid storage part and the nozzle.

6. A hand-held laundry treating apparatus comprising:

a portable body;

a supply tank including a tank body provided at the portable body, a water chamber provided in the tank body to store water therein, and a detergent chamber provided in the tank body to store detergent therein;

a suction tank including a suction chamber provided at the portable body to store liquid therein;

a liquid transferring part configured to supply liquid stored in the supply tank to laundry and transfer liquid remaining in laundry to the suction tank;

a supply nozzle communicating with the water chamber and the detergent chamber to guide liquid discharged from the supply tank to laundry; and

a suction nozzle communicating with the suction tank to suck liquid remaining in laundry to the suction tank,

wherein the liquid transferring part includes:

an air pump provided at the portable body and including a discharge port through which air is discharged and a suction port through which air is sucked;

an air supply channel configured to connect the discharge port and the supply nozzle;

an air suction channel configured to connect the suction port and the suction tank;

a discharge channel configured to connect the water chamber and the detergent chamber to the supply nozzle; and

a suction channel configured to connect the suction chamber to the suction nozzle, and

wherein the supply nozzle includes:

a nozzle body fixed to the supply tank and including a discharge part which communicates with an outside;

a spray body provided at the nozzle body;

a storage part provided in the spray body, into which liquid in the water chamber and the detergent chamber is introduced through the discharge channel;

a chamber provided at the spray body, to which the air supply channel is connected; and

a chamber connection pipe configured to transfer liquid in the storage part to the discharge part by connecting the chamber, the discharge part and the storage part to each other and transferring air introduced into the chamber to the discharge part.

7. The hand-held laundry treating apparatus according to claim **6**, wherein the supply tank includes:

a tank body which is removably coupled to the portable body and to which the nozzle body is fixed;

a first partition wall provided in the tank body to separate the water chamber and the detergent chamber from each other; and

a second partition wall provided in the detergent chamber to separate the detergent chamber from a space in which the discharge channel is provided.

8. The hand-held laundry treating apparatus according to claim **7**, wherein the suction tank is removably coupled to the nozzle body.

9. The hand-held laundry treating apparatus according to claim **7**, further comprising:

a tank valve by which only any one of the water chamber and the detergent chamber communicates with the storage part.

10. The hand-held laundry treating apparatus according to claim **9**, wherein the discharge channel includes a detergent discharge hole formed through the second partition wall, a water discharge pipe formed through the first partition wall, through which water in the water chamber is discharged, and a valve accommodation pipe by which the detergent discharge hole and the water discharge pipe communicate with each other,

the storage part further includes a connection channel which is connected to the detergent discharge hole, and

the tank valve includes a valve body which is inserted into the valve accommodation pipe through the detergent

discharge hole and is configured to move reciprocatingly in the valve accommodation pipe, and a channel switching part which is provided at the valve body and allows the detergent discharge hole and the connection channel to communicate with each other or the water discharge pipe and the connection channel to communicate with each other according to a position of the valve body.

11. The hand-held laundry treating apparatus according to claim **10**, wherein the channel switching part includes:

a first recess and a second recess which are concavely formed at an outer peripheral surface of the valve body and are spaced apart from each other by a certain distance; and

an opening/closing part which is provided between the first recess and the second recess to position the first recess or the second recess at the connection channel according to a position of the valve body,

and wherein a valve channel is configured to guide water in the valve accommodation pipe to the second recess.

12. A hand-held laundry treating apparatus comprising:

a portable body;

a supply tank including a tank body provided at the portable body, a water chamber provided in the tank body to store water therein, and a detergent chamber provided in the tank body to store detergent therein;

a suction tank including a suction chamber provided at the portable body to store liquid therein;

a liquid transferring part configured to supply liquid stored in the supply tank to laundry and transfer liquid remaining in laundry to the suction tank;

a supply nozzle communicating with the water chamber and the detergent chamber to guide liquid discharged from the supply tank to laundry;

a suction nozzle communicating with the suction tank to suck liquid remaining in laundry to the suction tank,

wherein the liquid transferring part includes:

an air pump provided at the portable body and including a discharge port through which air is discharged and a suction port through which air is sucked;

an air supply channel configured to connect the discharge port and the supply nozzle;

an air suction channel configured to connect the suction port and the suction tank;

a discharge channel configured to connect the water chamber and the detergent chamber to the supply nozzle; and

a suction channel configured to connect the suction chamber to the suction nozzle; and

a channel valve which is provided at the portable body and is configured to open the air supply channel and the air suction channel at the same time or open only any one of the air supply channel and the air suction channel,

wherein the channel valve includes:

a valve support body provided at the portable body;

a support body through-hole formed through the valve support body;

a discharge port connection pipe configured to connect the support body through-hole and the discharge port of the air pump;

a suction port connection pipe configured to connect the support body through-hole and the suction port of the air pump;

a supply channel connection pipe configured to connect the support body through-hole and the air supply channel;

a suction channel connection pipe configured to connect the support body through-hole and the air suction channel; and

a valve rotatably provided at the support body through-hole, and

wherein the valve allows the supply channel connection pipe and the suction channel connection pipe to respectively communicate with the discharge port connection pipe and the suction port connection pipe or allows only any one of the supply channel connection pipe and the suction channel connection pipe to communicate with only any one of the discharge port connection pipe and the suction port connection pipe according to a rotation angle.

13. The hand-held laundry treating apparatus according to claim **12**, wherein the valve includes:

a body rotatably provided at the support body through-hole;

a first body channel communicating with the discharge port connection pipe and extending toward the inside of the body;

a second body channel communicating with the supply channel connection pipe and connected to the first body channel;

a third body channel communicating with the suction port connection pipe and extending toward the inside of the body;

a fourth body channel communicating with the suction channel connection pipe and connected to the third body channel; and

a fifth body channel connected to the fourth body channel so as to communicate with the suction channel connection pipe when the body is rotated so that the second body channel and the fourth body channel respectively communicate with the discharge port connection pipe and the suction port connection pipe, and

wherein the valve support body further includes a communicating pipe which is connected to the support body through-hole and communicates with the first body channel when the fifth body channel is positioned at the suction channel connection pipe, and a communicating groove which is concavely formed at an outer peripheral surface of the valve support body and by which the communicating pipe communicates with the outside of the portable body.

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